General Specifications

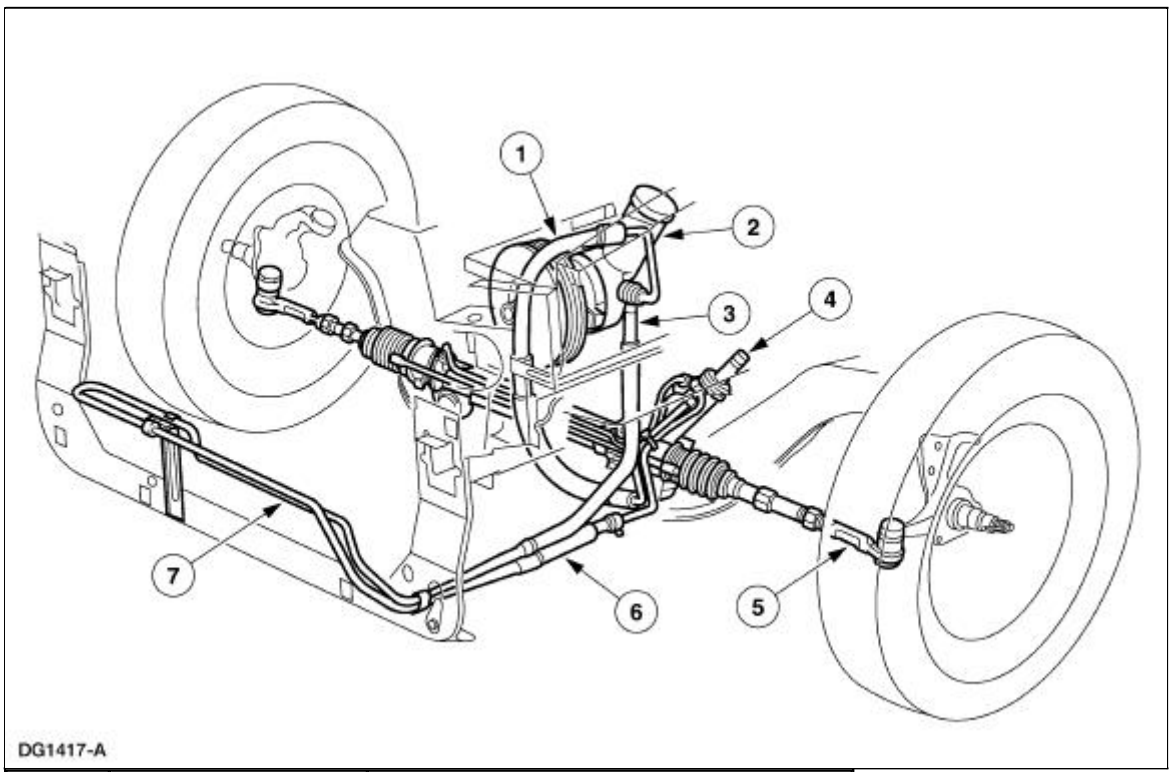
Item	Specification
Lubricants	
Motorcraft MERCON® Multi-Purpose (ATF) Transmission Fluid XT-2-QDX	MERCON®
Power Steering Gear	
Turning effort	2.27 Kg (5.0 lb)
Turns lock-to-lock	2.38
Power Steering Purge Vacuum	
Vacuum	68-85 kPa (20-25 in/hg)
Power Steering Pump — CII	
Flow	9.8 liters/minute (2.6 gpm) Fluid @ 74°-80° C (165°-175° F) Engine at 1,500 rpm
Pressure	1,034 kPa (150 psi) Fluid @ 74°-80° C (165°-175° F) Engine at 1,500 rpm
Minimum capacity	3.4 liters/minute (0.9 gpm) Fluid @ 74°-80° C (165°-175° F) Engine at idle Pressure at 5,102 kPa (750 psi)
Relief pressure	7,240-8,400 kPa (1,050-1,230 psi)
Power Steering Pump — CIII	
Flow	9.8 liters/minute (2.6 gpm) Fluid @ 74°-80° C (165°-175° F) Engine at 1,500 rpm
Pressure	1,034 kPa (150 psi) Fluid @ 74°-80° C (165°-175° F) Engine at 1,500 rpm
Minimum capacity	4.7 liters/minute (1.25 gpm) Fluid @ 74°-80° C (165°-175° F) Engine at idle Pressure at 5,171 kPa (750 psi)

Relief pressure	8,274-9,510 kPa (1,200-1,380 psi)

Steering System

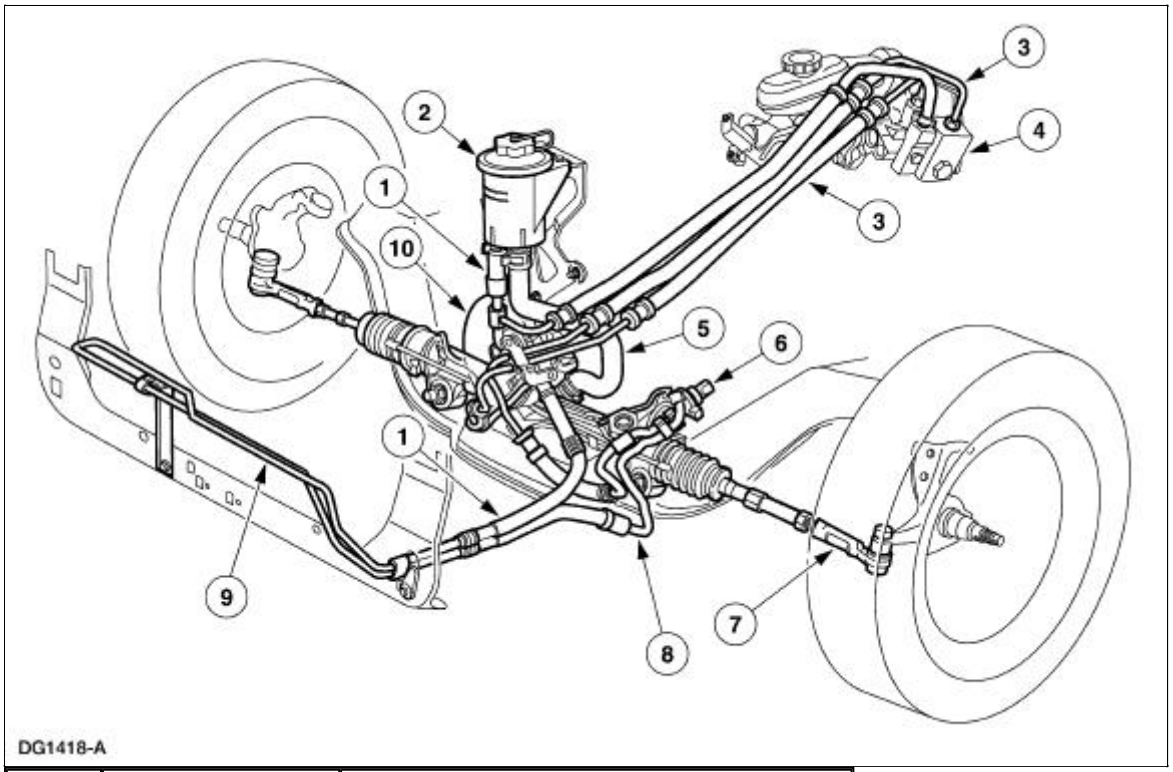
The steering system has a typical rack-and-pinion design consisting of the following:

Steering System Components — 3.8L Engine (CII Power Steering Pump)



Item	Part Number	Description
1	3A714	Power steering hose
2	3A674	Power steering pump
3	3493	Power steering hose
4	3504	Steering gear
5	3A130	Tie-rod end
6	3493	Power steering hose
7	3D746	Power steering fluid cooler

Steering System Components — 4.6L Engine (CIII Power Steering Pump)



Item	Part Number	Description
1	3A713	Power steering hose
2	3R700	Power steering pump reservoir
3	3A714	Power steering hose
4	2B559	Hydro-boost assy
5	3E525	Power steering hose
6	3504	Steering gear
7	3A130	Tie-rod end
8	3A713	Power steering hose
9	3D746	Power steering fluid cooler
10	3A674	Power steering pump

For information on the power steering oil reservoir (3A697), refer to Section 211-02 .

For information on the steering wheel and column assembly, refer to Section 211-04 .

For information on the power steering hoses, refer to Section 211-02 .

For information on the front wheel spindles, refer to Section 204-01 .

For information on the power steering fluid cooler, refer to Section 211-02 .

For information on the power steering pump, refer to Section 211-02 .

For information on the steering gear, refer to Section 211-02 .

Steering System

Special Tool(s)

ST1396-A	Dial Thermometer 0-220°F 023-R0007 or Equivalent
ST1177-A	Hand Held Automotive Meter 105-R0053 or Equivalent
ST1477-A	Power Steering Analyzer 211-F001 (014-00207) or Equivalent
ST1689-A	Spring Scale 211-034 (T74P-3504-Y)
ST1398-A	Tach Adapter 418-F102 (007-00061) or Equivalent
ST1688-A	Tie-Rod End Remover Tool 211-001 (TOOL-3290-D) or Equivalent

Inspection and Verification

CAUTION: Do not hold the steering wheel (3600) at the stops for an extended amount of time. Damage to the power steering pump (3A674) will result.

NOTE: Make the following preliminary checks before repairing the steering system:

1. Verify the customer concern by operating the steering system.

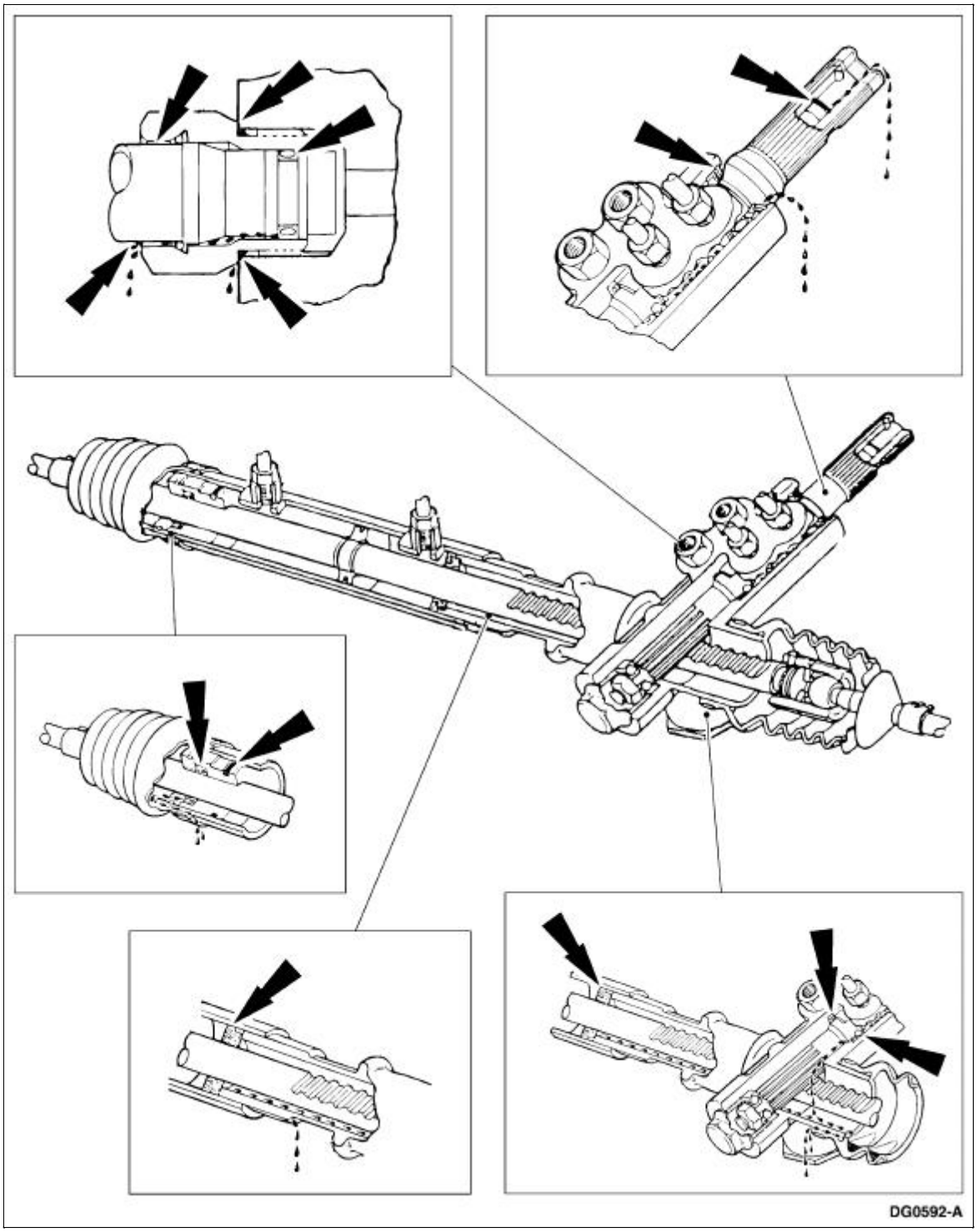
2. Inspect Tires
   - Check the tire pressure. Refer to the Vehicle Certification (VC) label.
   - Verify that all tires are sized to specification.
   - Check the tires for damage or uneven wear.

3. Belt and Tensioner Check
   - Refer to Section 303-05 for diagnosis and testing of the accessory drive system.

4. Fluid Level Check
   - Verify that the power steering fluid level is within the appropriate indicated range, hot for the 3.8L engine and cold for the 4.6L engine. Add Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

5. Air Bleeding
   - Verify that there is no air in the power steering system. Run the engine (6007) until it reaches normal operating temperature. Turn the steering wheel to the left and right several times without hitting the stops. If any air bubbles are present, refer to Purging—CII Power Steering Pump or Purging—CIII Power Steering Pump in this section.

External Leak Check — Typical Power Rack-and-Pinion Steering Gear



6. External Leak Check
    - With the ignition switch at OFF, wipe off the power steering pump, power steering hoses, power steering fluid cooler (3D746) and steering gear (3504).
    - With the engine running, turn the steering wheel from stop-to-stop several times. Do not hold steering wheel at stops. Check for leaks. Repair as necessary if leaks are observed.

7. Turning Effort Check
    - Refer to Turning Effort Test under Component Tests in this section.

8. Visually inspect for obvious signs of mechanical damage; refer to the following chart.

Visual Inspection Chart

Mechanical
• Loose tie-rod ends • Loose suspension components • Loose steering column shaft universal joints • Loose column intermediate shaft bolts • Steering gear • Binding or misaligned steering column • Power steering pump • Bent or pinched power steering hoses

9. If an obvious cause for an observed or reported malfunction is found, correct the cause (if possible) before proceeding to the next step.

10. If the fault is not visually evident, determine the symptom and proceed to the following symptom chart.

Steering System Symptom Definitions

Drift/Pull

Pull is a tugging sensation, felt by the hands on the steering wheel, that must be overcome to keep the vehicle going straight.

Drift describes what a vehicle with this condition does with hands off the steering wheel.

- A vehicle-related drift/pull, on a flat road, will cause a consistent deviation from the straight-ahead path and require constant steering input in the opposite direction to counteract the effect.
- Drift/pull may be induced by conditions external to the vehicle (i.e., wind, road camber).

Excessive Steering Wheel Play

Excessive steering wheel play is a condition in which there is too much steering wheel movement before the wheels move. A small amount of steering wheel free play is considered normal.

Feedback

Feedback is a roughness felt in the steering wheel when the vehicle is driven over rough pavement.

Hard Steering or Lack of Assist

Hard steering or lack of assist is experienced when the steering wheel effort exceeds specifications. Hard steering can remain constant through the full turn or occur near the end of a turn. It is important to know the difference between hard steering/lack of assist and binding.

Hard steering or lack of assist can result from either hydraulic or mechanical conditions. It is extremely important to know if this concern occurs during driving, during very heavy or static parking maneuvers.

Nibble

Sometimes confused with shimmy, nibble is a condition resulting from tire interaction with various road surfaces and observed by the driver as small rotational oscillations of the steering wheel.

Poor Returnability/Sticky Steering

Poor returnability and sticky steering is used to describe the poor return of the steering wheel to center after a turn or the steering correction is completed.

Shimmy

Shimmy, as observed by the driver, is large, consistent, rotational oscillations of the steering wheel resulting from large, side-to-side (lateral) tire/wheel movements.

Shimmy is usually experienced near 64 km/h (40 mph), and can begin or be amplified when the tire contacts pot holes or irregularities in the road surface.

Wander

Wander is the tendency of the vehicle to require frequent, random left and right steering wheel corrections to maintain a straight path down a level road.

Symptom Chart

Symptom Chart

Condition	Possible Sources	Action
• Hard Steering or Lack of Assist	• Seized lower steering column shaft U-joints.	• INSTALL a new lower steering column shaft. REFER to Section 211-04 .
	• Damaged, fractured steering column bearing(s).	• REPAIR the steering column. REFER to Section 211-04 .
	• Power steering pump.	• GO to Pump Flow and Pressure Test Component Test in this section.
	• Suspension components.	• REFER to Section 204-00 for suspension system diagnosis and testing.
	• Steering gear internal leakage.	• GO to Pump Flow and Pressure Test Component Test in this section.
• Excessive Steering Pump Noise	• Power steering pump.	• GO to Pump Flow and Pressure Test Component Test in this section.
• Excessive Steering Wheel Play	• Damaged, loose, or worn tie-rod end (3A130).	• GO to the Steering Linkage Component Test.
	• Loose, worn or damaged front wheel spindle tie-rod (3280).	• GO to the Tie-Rod Articulation Torque Component Test.
	• Damaged/worn steering gear.	• INSTALL a new steering gear. REFER to Section 211-02 .
	• Loose, worn or damaged steering	• INSTALL new steering column

	column bearing(s). ● Loose, worn or damaged lower steering column shaft U-joint(s).	bearing(s). REFER to Section 211-04 . ● INSTALL a new lower steering column shaft. REFER to Section 211-04 .
● Wander	● Unevenly loaded or overloaded vehicle. ● Loose, worn or damaged front wheel spindle tie-rod. ● Loose, worn or damaged tie-rod ends. ● Loose or damaged steering gear mounting bolts. ● Loose lower steering column shaft U-joint bolts. ● Loose, worn or damaged lower steering column shaft U-joints. ● Loose, worn or damaged steering column bearing(s). ● Suspension components.	● INFORM the customer of incorrect vehicle loading. ● GO to the Tie-Rod Articulation Torque Component Test. ● GO to the Steering Linkage Component Test. ● INSTALL new or TIGHTEN bolts. REFER to Section 211-02 . ● TIGHTEN the bolts. REFER to Section 211-04 . ● INSTALL a new lower steering column shaft. REFER to Section 211-04 . ● INSTALL new steering column bearings. REFER to Section 211-04 . ● REFER to Section 204-00 for suspension system diagnosis and testing.
● Drift/Pull	● Unevenly loaded or overloaded vehicle. ● Wheel alignment. ● Loose, worn or damaged front wheel spindle tie-rod. ● Loose, worn or damaged tie-rod ends. ● Suspension components. ● The steering gear valve effort out of balance. ● Check the brake system for proper	● INFORM the customer of incorrect vehicle loading. ● CHECK the wheel alignment. ADJUST as required. REFER to Section 204-00 . ● GO to the Tie-Rod Articulation Torque Component Test. ● GO to the Steering Linkage Component Test. ● REFER to Section 204-00 for suspension system diagnosis and testing. ● GO to Steering Gear Valve Component Test in this section. ● REFER to Section 206-00 .

	operation. • Incorrect frame/underbody alignment.	• CORRECT as required. REFER to Frame Dimension Manual.
• Feedback	• Loose, worn or damaged front wheel spindle tie-rod. • Loose, worn or damaged tie-rod ends. • Loose or damaged steering gear insulators or bolts. • Loose lower steering column shaft U-joint bolts. • Loose suspension bushings, fasteners or ball joints. • Worn or damaged steering column bearing(s).	• GO to the Tie-Rod Articulation Torque Component Test. • GO to the Steering Linkage Component Test. • INSTALL new or TIGHTEN the retaining bolts. REFER to Section 211-02 . • TIGHTEN the bolts. REFER to Section 211-04 . • INSTALL new suspension components as necessary. REFER to Section 204-01 . • INSTALL new steering column bearing(s). REFER to Section 211-04 .
• Poor Returnability/Sticky Steering	• Binding lower steering column shaft U-joints. • Loose, worn or damaged front wheel spindle tie-rod. • Loose, worn or damaged tie-rod ends. • Suspension components. • Binding steering column bearing(s).	• INSTALL a new lower steering column shaft. REFER to Section 211-04 . • GO to the Tie-Rod Articulation Torque Component Test. • GO to the Steering Linkage Component Test. • REFER to Section 204-00 for suspension system diagnosis and testing. • INSTALL new steering column bearing(s). REFER to Section 211-04 .
• Shimmy	• Loose, worn or damaged tie-rod end. • Loose, worn or damaged front wheel spindle tie-rod. • Suspension components.	• GO to the Steering Linkage Component Test. • GO to the Tie-Rod Articulation Torque Component Test. • REFER to Section 204-00 for suspension system diagnosis and testing.

Component Tests

Steering Linkage

1. **NOTE:** Excessive **vertical** motion of the studs relative to the sockets may indicate excessive wear.

   With the parking brake applied, perform the following:

   - Have an assistant rotate the steering wheel back and forth 360 degrees and watch for relative motion of the studs in the tie-rod end ball sockets.
   - Watch for loose steering gear mounting.

2. Another method is to raise the front wheels (1007) off the ground, grasp the wheel at the front and rear and watch for excessive play or binding in the joints while trying to steer the wheels.

3. Install new steering components as necessary. For additional information, refer to the appropriate Group 2 steering section.

Turning Effort Test

NOTE: Make sure that the front wheels are properly aligned and the tire pressure is correct before checking the effort.

1. Park the vehicle on dry concrete and set the parking brake.

2. Insert a thermometer into the power steering pump reservoir.

3. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

   Idle the engine for two to three minutes. Turn the steering wheel from stop-to-stop several times to warm the fluid to 50-60°C (122-140°F).

4. With the engine running, attach special tool 211-034 (T74P-3504-Y) to the rim of the steering wheel.

5. Measure the pull required to turn the steering wheel one complete revolution in each direction. Refer to Steering Wheel Turning Effort under General Specifications in this section.

Pump Flow and Pressure Test

WARNING: Do not touch the flowmeter during the test procedure, or severe burns and serious injury may occur.

1. **CAUTION: Make sure that the connection point will not interfere with any of the engine accessory drive components or drive belts.**

   Install special tool 211-F001 (014-00207) at the high pressure port of the power steering pump. Make sure the power steering analyzer gate valve is fully open.

- On some vehicles, the power steering pump high pressure port is inaccessible and the special tool should then be installed either at the steering gear or at a point in the high pressure line between the power steering pump and the steering gear.

2. Place a dial thermometer in the power steering pump reservoir.

3. Check the power steering fluid level. If necessary, add power steering fluid.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

4. Install a digital tachometer.

5. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

   Start the engine. Place the transmission in neutral. Set the parking brake. Raise the power steering fluid temperature to 74-80°C (165-175°F) by rotating the steering wheel fully to the left and right several times.

6. Set the engine speed to 1500 rpm. Record the flow rate and pressure readings.
   - If the flow rate is below the flow rate specification, a new power steering pump may need to be installed. Continue with the test procedure.
   - If the pressure reading is above the maximum pressure specification, then check power steering hoses for kinks and restrictions.

7. Partially close the gate valve to obtain 750 psi. Set the engine speed at idle. Record the flow rate.
   - If the flow is less than the specified flow rate, then install a new power steering pump. For additional information, refer to Section 211-02 .

8. **CAUTION: Do not allow the gate valve to remain closed for more than 5 seconds.**

   Completely close and partially open the gate valve 3 times. Record the pressure relief valve actuation pressure reading.
   - If the pressure does not meet the relief pressure specification, install a new power steering pump. For additional information, refer to Section 211-02 .

9. Set engine speed to 1500 rpm. Record the flow rate.
   - If the flow rate varies more than 3.785 liters/minute (1 gallon/minute) from the initial flow rate reading, install a new power steering pump. For additional information, refer to Section 211-02 .

10. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

    Set the engine speed at idle. Turn (or have an assistant turn) the steering wheel to the left and right stops. Record flow rate and pressure readings at the stops.
    - The pressure reading at both stops should be nearly the same as the maximum pump relief pressure.
    - The flow rate should drop below 1.9 liters/minute (0.5 gallons/minute).
    - If the pressure does not reach the maximum pump relief pressure or the flow rate does not drop below the specified value, excessive internal leakage is occurring. Install a new steering gear as necessary. For additional information, refer to Section 211-02 .

11. Turn (or have an assistant turn) the steering wheel slightly in both directions and release quickly while watching the pressure gauge.
    - The pressure reading should move from the normal back pressure reading and snap back as the steering wheel is released.
    - If the pressure returns slowly or sticks, the rotary valve in the steering gear is sticking or the steering column is binding. Check the steering column and linkages before servicing the steering gear.

Tie-Rod Articulation Torque

1. **NOTE:** This check may be done with the steering gear on or off the vehicle.

   Disconnect the tie-rod end from the front wheel spindle. For additional information, refer to Section 211-02 .

2. Move the front wheel spindle tie-rod back and forth three times.

3. Hook the special tool 211-034 (T74P-3504-Y) over the tie-rod end or the threaded portion of the front wheel spindle tie-rod and measure the force required to move the front wheel spindle tie-rod. Refer to Tie-Rod Articulation Torque in General Specifications in this section.

4. If the force required to move the front wheel spindle tie-rod does not meet the specifications, install a new front wheel spindle tie-rod. For additional information, refer to Section 211-02 .

Steering Gear Valve

1. With the vehicle in motion, place the transmission in NEUTRAL and turn the engine OFF.
    - If the vehicle does not pull with the engine OFF, install a new steering gear. For additional information, refer to Section 211-02 .

2. If the vehicle pulls with the engine OFF, cross-switch the front wheels.

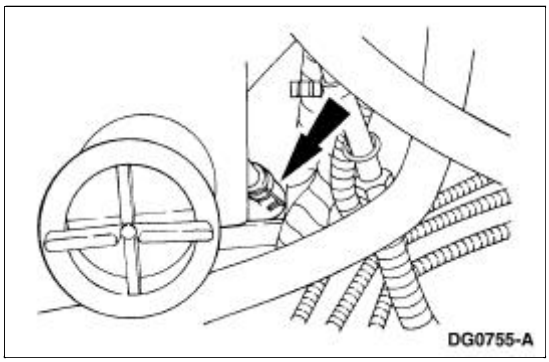
3. If the vehicle pulls to the opposite side, cross-switch the front and rear wheels on the same side.

4. If the vehicle pull direction does not change, check the front suspension components, wheel alignment and frame alignment. For additional information, refer to Section 204-00 or frame dimensions manual.

System Flushing —CII Power Steering Pump

WARNING: Do not mix oil types. Any mixture or any unapproved oil can lead to seal deterioration and leaks. A leak can ultimately cause loss of fluid, which can result in a loss of power steering assist.

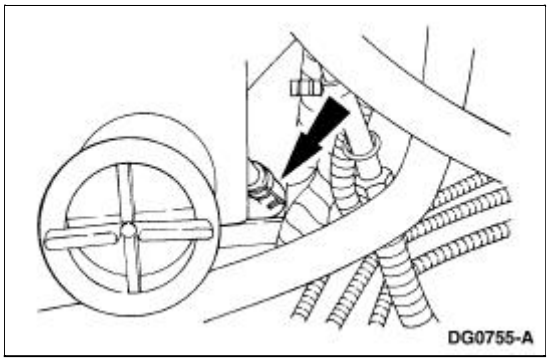
1. Remove the fuel pump fuse from the battery junction box.
2. Disconnect the power steering return hose. Plug the reservoir.



3. Attach an extension hose between the power steering return hose and an empty container.
4. Raise the front wheels off the floor. For additional information, refer to Section 100-02 .
5. Check the fluid level. If necessary, fill the reservoir to the correct level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.
6. **CAUTION: Do not crank the engine for more than 15 seconds at a time. Allow the starter to cool for 1 minute before cranking again. Premature starter failure can occur.**

   CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.

   Turn the steering wheel from stop-to-stop while cranking the engine until the fluid exiting the power steering return hose is clear of all contamination and foreign material.
   - Add Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent as needed.
7. Lower the vehicle.
8. Disconnect the extension hose from the power steering return hose. Remove the plug. Attach the power steering return hose to the reservoir.



9. **CAUTION: Do not overfill the reservoir.**

   Check the fluid level. If necessary, fill the reservoir to the correct level.

   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

10. Install the fuel pump fuse.

11. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

    Start the engine and turn the steering wheel from stop-to-stop.

12. **CAUTION: Do not overfill the reservoir.**

    NOTE: If the power steering system is noisy and is accompanied by evidence of aerated fluid it will be necessary to purge the power steering system.

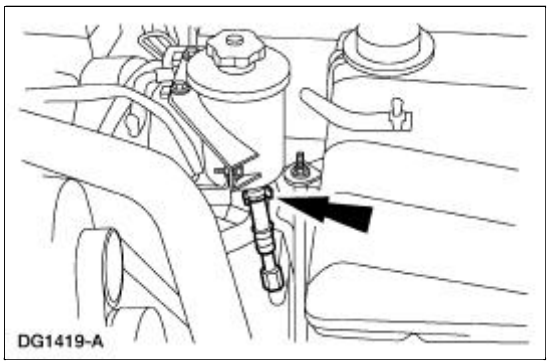
    Check the fluid level. If necessary, fill the reservoir to the correct level.

    - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

System Flushing —CIII Power Steering Pump

WARNING: Do not mix oil types. Any mixture or any unapproved oil can lead to seal deterioration and leaks. A leak can ultimately cause loss of fluid, which can result in a loss of power steering assist.

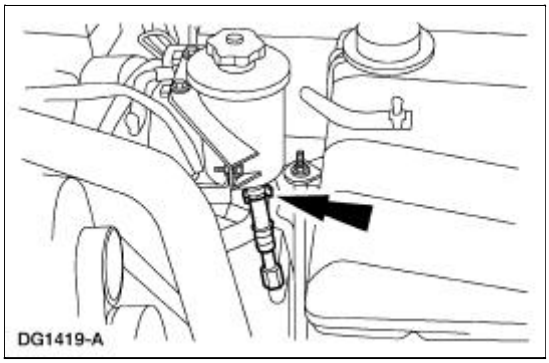
1. Remove the fuel pump fuse from the battery junction box.
2. Disconnect the power steering return hose. Plug the reservoir.



3. Attach an extension hose between the power steering return hose and an empty container.
4. Raise the front wheels off the floor. For additional information, refer to Section 100-02 .
5. Check the fluid level. If necessary, fill the reservoir to the correct level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.
6. **CAUTION: Do not crank the engine for more than 15 seconds at a time. Allow the starter to cool for 1 minute before cranking again. Premature starter failure can occur.**

   CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump could occur.

   Turn the steering wheel from stop-to-stop while cranking the engine until the fluid exiting the power steering return hose is clear of all contamination and foreign material.
   - Add Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent as needed.
7. Lower the vehicle.
8. Disconnect the extension hose from the power steering return hose. Remove the plug. Attach the power steering return hose to the reservoir.



9. **CAUTION: Do not overfill the reservoir.**

   Check the fluid level. If necessary, fill the reservoir to the correct level.

   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

10. Install the fuel pump fuse.

11. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

    Start the engine and turn the steering wheel from stop-to-stop.

12. **CAUTION: Do not overfill the reservoir.**

    NOTE: If the power steering system is noisy and is accompanied by evidence of aerated fluid it will be necessary to purge the power steering system.

    Check the fluid level. If necessary, fill the reservoir to the correct level.

    - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

Purging —CII Power Steering Pump

Special Tool(s)

ST1176-A	Vacuum Pump 416-D002 (D95L-7559-A) or Equivalent

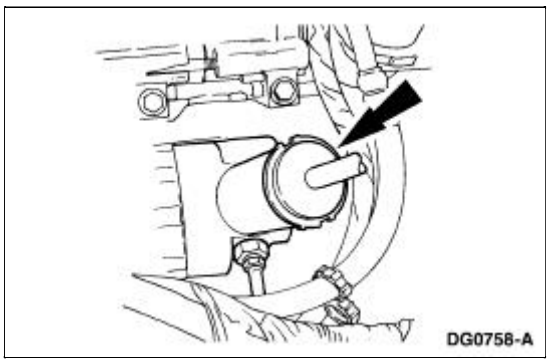
CAUTION: If the air is not purged from the power steering system correctly, premature power steering pump failure can result. This condition can occur on pre-delivery vehicles with evidence of aerated fluid or on vehicles that have had steering component repairs.

1. **NOTE:** A whine heard from the power steering pump may be caused by air in the system. The power steering purge procedure must be performed prior to any component repair for which power steering noise complaints are accompanied by evidence of aerated fluid.

   Remove the reservoir cap. Check the fluid level. If necessary, fill the reservoir to the correct level.

   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

2. Tightly insert the Vacuum Pump stopper into the reservoir.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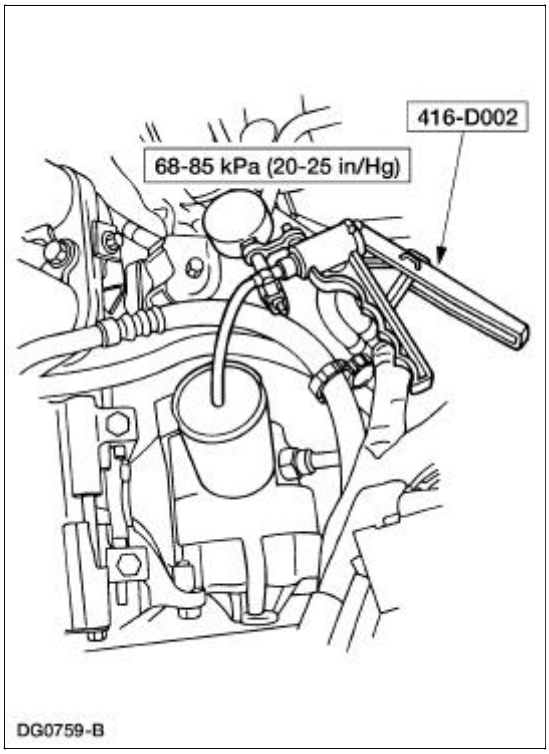
3. Start the vehicle.

4. Using the special tool, apply maximum vacuum and maintain it for a minimum of three minutes with the engine speed set at idle.

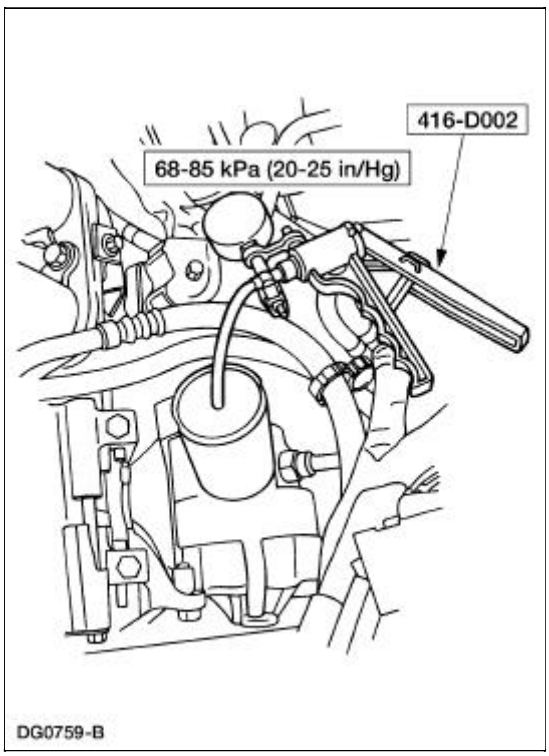


5. Release the vacuum and remove the special tool.

6. **CAUTION: Do not overfill the reservoir.**

   Check the fluid level. If necessary, fill the reservoir to the proper level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

7. Reinstall the special tool. Apply and maintain maximum vacuum.



8. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

   Cycle the steering wheel fully to the left and right every 30 seconds for approximately five minutes.

9. Stop the engine, release the vacuum, and remove the special tool.

10. Install the reservoir cap.

11. Check for fluid leaks at all of the connections. If the power steering fluid shows signs of air, repeat this procedure.

Purging —CIII Power Steering Pump

Special Tool(s)

ST1176-A	Vacuum Pump 416-D002 (D95L-7559-A) or Equivalent

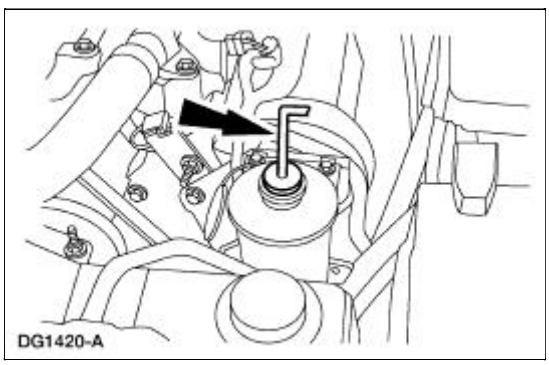
CAUTION: If the air is not purged from the power steering system correctly, premature power steering pump failure can result. This condition can occur on pre-delivery vehicles with evidence of aerated fluid or on vehicles that have had steering component repairs.

1. **NOTE:** A whine heard from the power steering pump may be caused by air in the system. The power steering purge procedure must be performed prior to any component repair for which power steering noise complaints are accompanied by evidence of aerated fluid.

   Remove the reservoir cap. Check the fluid level. If necessary, fill the reservoir to the correct level.

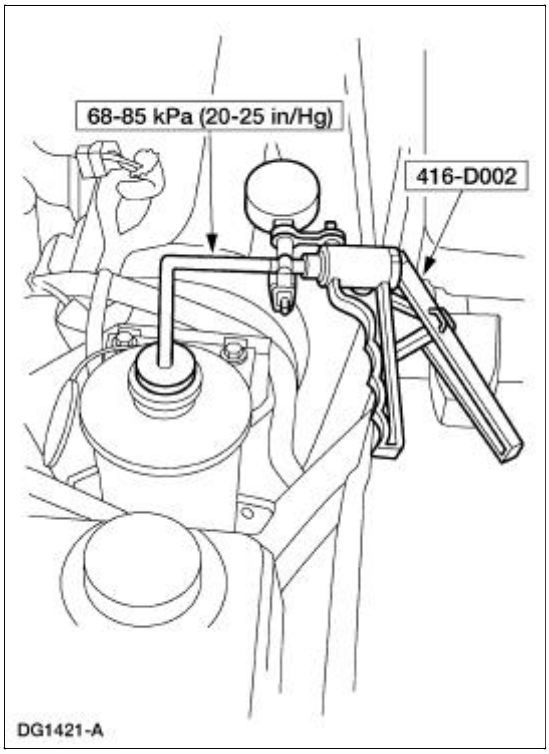
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

2. Tightly insert the Vacuum Pump stopper into the reservoir.



3. Start the vehicle.

4. Using the special tool, apply maximum vacuum and maintain it for a minimum of three minutes with the engine speed set at idle.

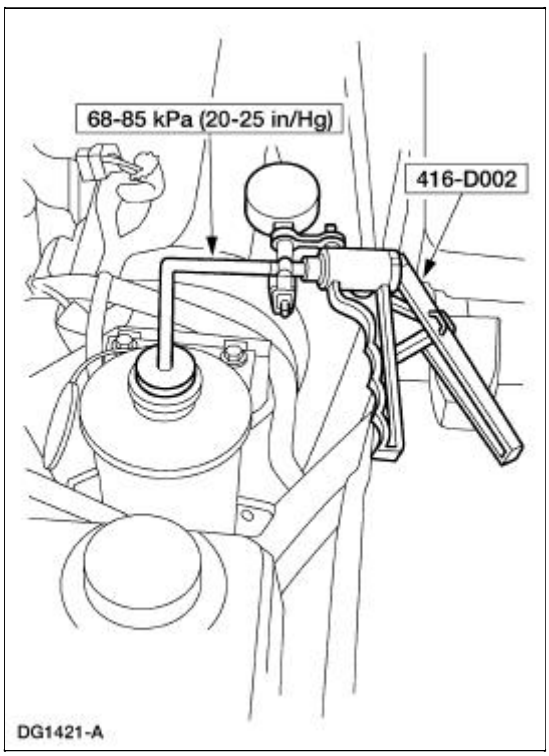


5. Release the vacuum and remove the special tool.

6. **CAUTION: Do not overfill the reservoir.**

   Check the fluid level. If necessary, fill the reservoir to the correct level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

7. Reinstall the special tool. Apply and maintain maximum vacuum.



8. **CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.**

   Cycle the steering wheel fully to the left and right every 30 seconds for approximately five minutes.

9. Stop the engine, release the vacuum, and remove the special tool.

10. Install the reservoir cap.

11. Check for fluid leaks at all of the connections. If the power steering fluid shows signs of air, repeat this procedure.

Fill

1. **WARNING: Do not mix oil types, any mixture or any unapproved oil can lead to seal deterioration and leaks. A leak can ultimately cause loss of fluid, which can result in a loss of power steering assist.**

   Check the fluid level. If necessary, fill the reservoir to the correct level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

2. Remove the fuel pump fuse from the battery junction box.

3. Raise the front wheels off the floor. For additional information, refer to Section 100-02 .

4. **CAUTION: Do not crank the engine for more than 15 seconds at a time. Allow the starter to cool for 1 minute before cranking again. Premature starter failure can occur.**

   CAUTION: Do not hold the steering wheel against the stops for more than three to five seconds at a time. Damage to the power steering pump will occur.

   Turn the steering wheel from stop-to-stop while cranking the engine.

5. Lower the vehicle.

6. **CAUTION: Do not overfill the reservoir.**

   Check the fluid level. If necessary, fill the reservoir to the correct level.
   - Use Motorcraft MERCON® Multi-Purpose ATF XT-2-QDX or MERCON® equivalent.

7. Install the fuel pump fuse.

General Specifications

Item	Specification
Lubricants	
Motorcraft Multi-Purpose (ATF) Transmission Fluid XT-2-QDX	MERCON®
Silicone Dielectric Compound D7AZ-19A331-A	ESE-M1C171-A
Steering Gear Grease C3AZ-19578-A	ESW-M1C87-A

Torque Specifications

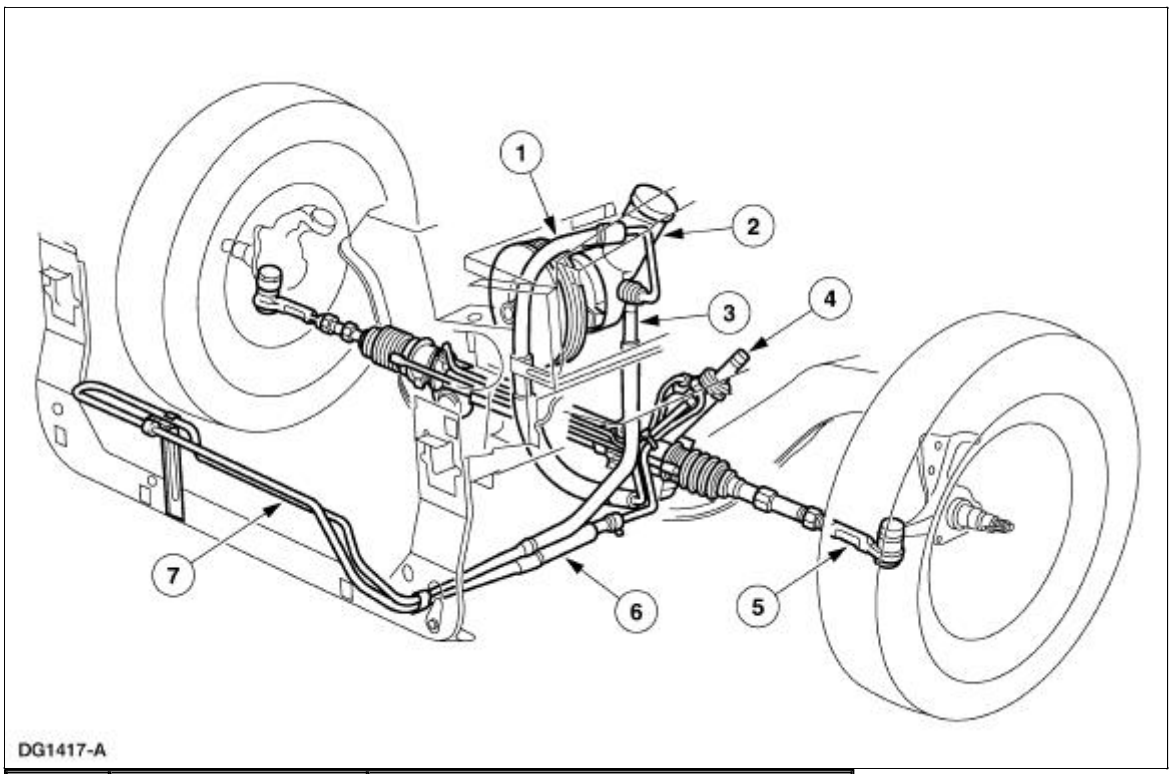
Description	Nm	lb-ft	lb-in
Front wheel spindle tie-rod	100	74	—
Power steering pump mounting bolts (CII pump)	51	38	—
Power steering pump mounting bolts (CIII pump)	25	18	—
Pressure line fitting (CII pump)	40	30	—
Pressure line fitting (CIII pump)	65	48	—
Pressure line fitting	30	22	—
Return line fitting (steering gear)	30	22	—
Steering gear mounting nut	48	35	—
Steering intermediate shaft coupling pinch bolt	34	25	—
Tie-rod end castellated nut	56 [a]	11 [a]	—
Tie-rod end jam nut	55	41	—

[a] Once torque is reached, continue turning to align slot in nut with cotter pin hole in tie-rod.

Power Steering

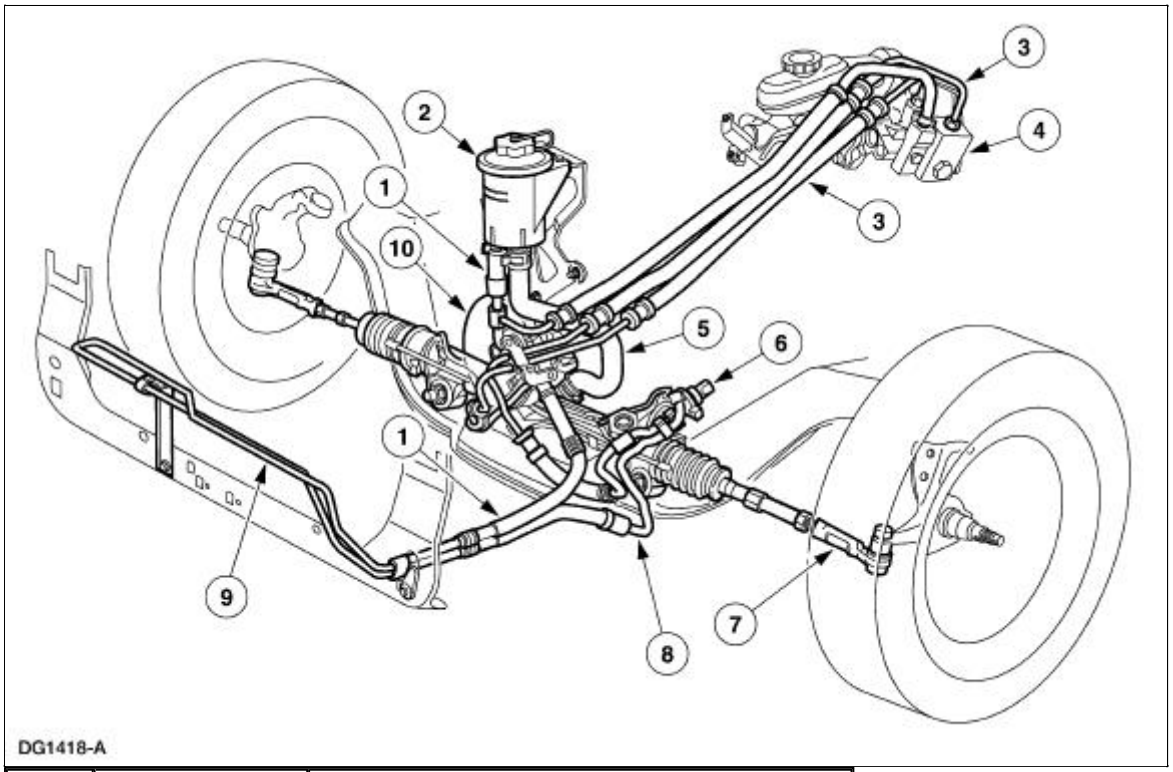
System View

Steering System Components — 3.8L Engine



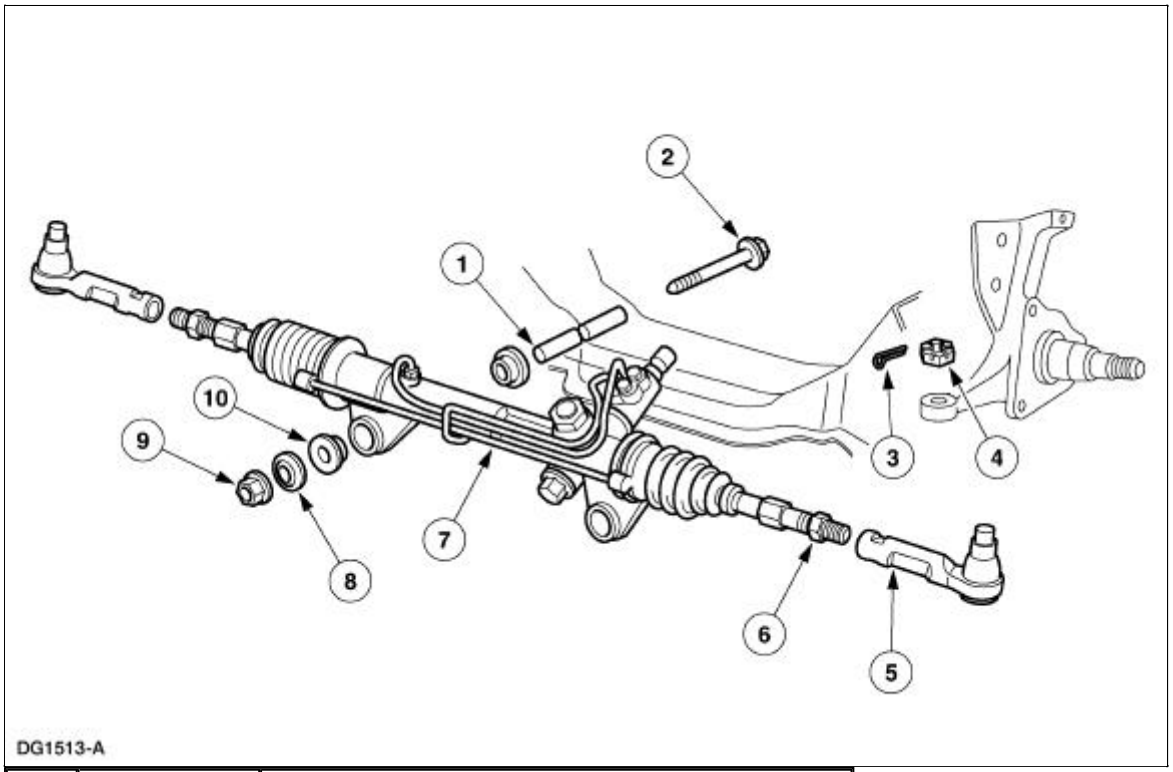
Item	Part Number	Description
1	3A714	Power steering hose
2	3A674	Power steering pump
3	3493	Power steering hose
4	3504	Steering gear
5	3A130	Tie-rod end
6	3493	Power steering hose
7	3D746	Power steering fluid cooler

Steering System Components — 4.6L Engine



Item	Part Number	Description
1	3A713	Power steering return hose
2	3R700	Power steering pump reservoir
3	3A714	Power steering hose
4	—	Hydroboost unit
5	3E525	Power steering reservoir pump hose
6	3504	Steering gear
7	3289	Tie-rod end
8	3A713	Power steering return hose
9	3D746	Power steering fluid cooler
10	3A674	Power steering pump

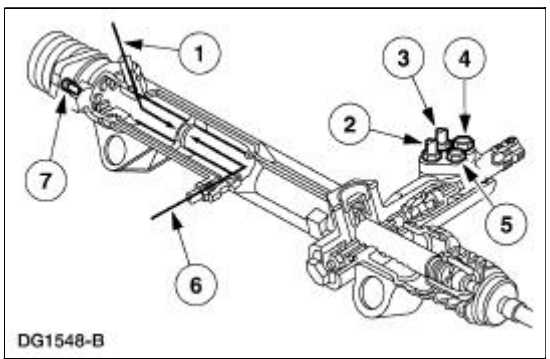
Steering Gear Mounting



DG1513-A

Item	Part Number	Description
1	3E552	Steering gear mounting bracket (2 req'd)
2	N803736-S192	Bolt (2 req'd)
3	72044-S36	Cotter pin (2 req'd)
4	385002-S2	Nut (2 req'd)
5	3289	Tie-rod end (2 req'd)
6	385032-S2	Nut (2 req'd)
7	3504	Steering gear
8	N803734-S2	Washer (2 req'd)
9	N620483-S60	Nut (2 req'd)
10	3F640	Steering gear mounting bracket housing insulator (2 req'd)

Steering Gear

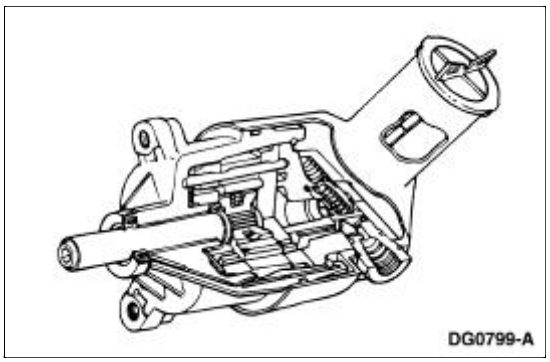


DG1548-B

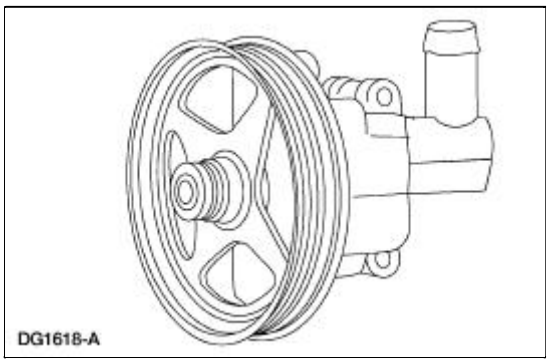
Item	Part Number	Description
1	—	Oil flow — left turn

2	—	To left turn port
3	—	To right turn port
4	—	Return port (out)
5	—	Pressure port (in)
6	—	Oil flow — right turn
7	—	Air transfer tube (between bellows)

Power Steering Pump — CII



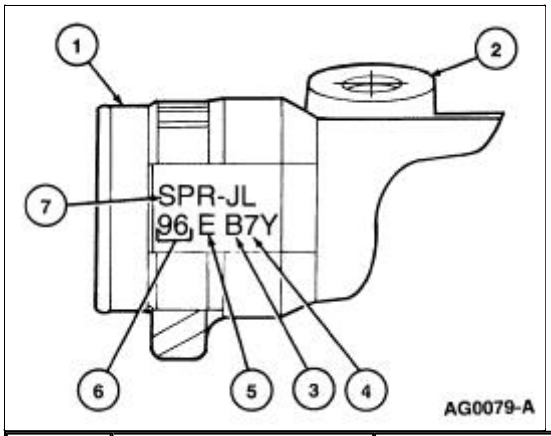
Power Steering Pump — CIII



Power Steering Gear Identification

CAUTION: Always use the ID code when ordering service parts.

The steering gear identification code is stamped into the housing.

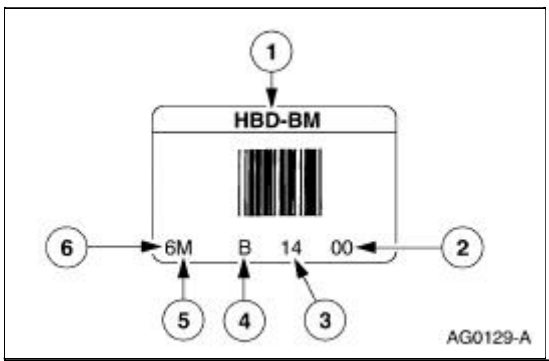


Item	Part Number	Description
1	—	Steering gear housing
2	—	Mounting boss
3	—	Shift code
4	—	Day code
5	—	Month code
6	—	Build year
7	—	Steering gear model code

Power Steering Pump Identification

CAUTION: Always use the ID code when ordering service parts.

The pump identification code is located on a tag attached to the power steering pump.

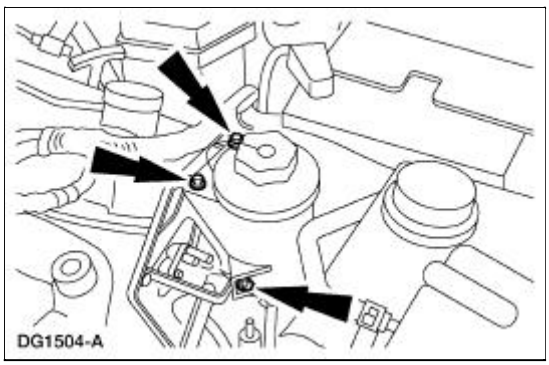


Item	Part Number	Description
1	—	Model code
2	—	For manufacturing purposes only
3	—	Day of the month (A = Jan., B = Feb., etc., I is not used)
4	—	Shift
5	—	Month
6	—	Year

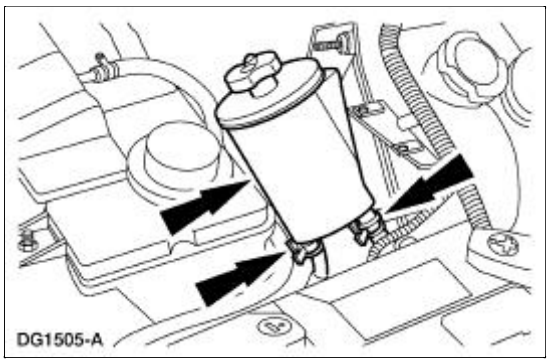
Reservoir —CIII Pump

Removal

1. Remove the bolts.



2. Disconnect the power steering hoses. Remove the reservoir.

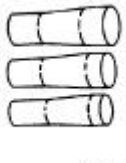


Installation

1. To install, reverse the removal procedure.
2. Fill and leak check the power steering system. For additional information, refer to Section 211-00 .

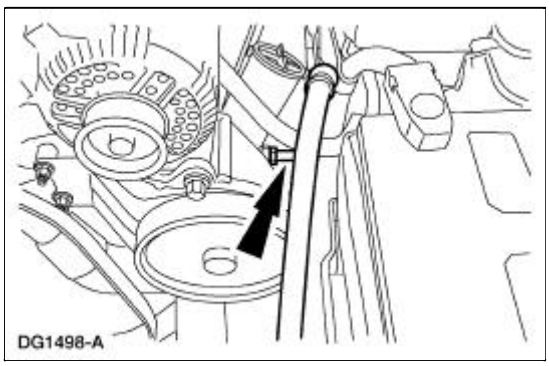
Pump —CII

Special Tool(s)

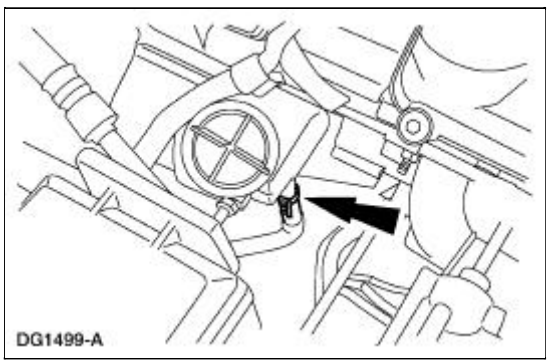
 ST1444-A	Teflon Seal Replacer Set 211D027 (D90P-3517-A) or equivalent

Removal and Installation

1. Disconnect the power steering hose. Remove and discard the seal ring.

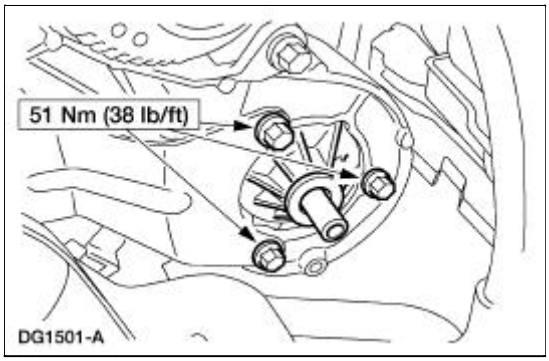

DG1498-A

2. Disconnect the power steering hose.

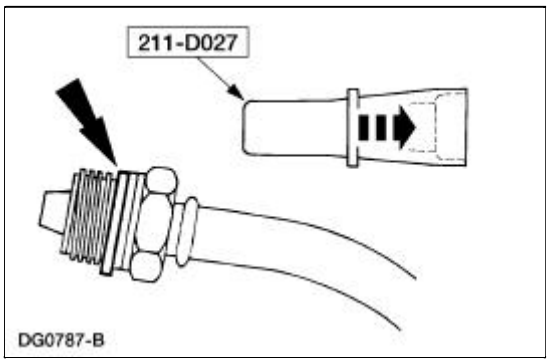

DG1499-A

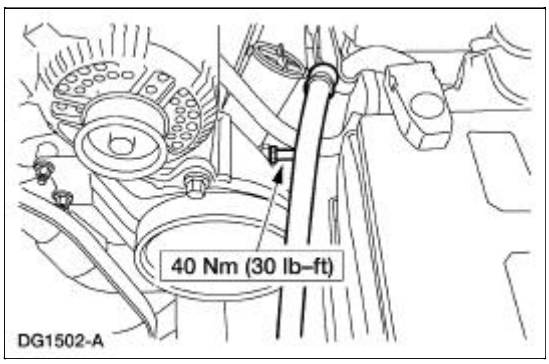
3. Remove the pulley. For additional information, refer to Pulley—CII Pump in this section.

4. Remove bolts and the power steering pump (3A674).



5. To install, reverse the removal procedure.
    - Using the special tool, install a new seal ring.

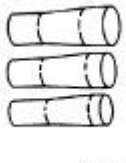




6. Fill and leak check the power steering system. For additional information, refer to Section 211-00 .

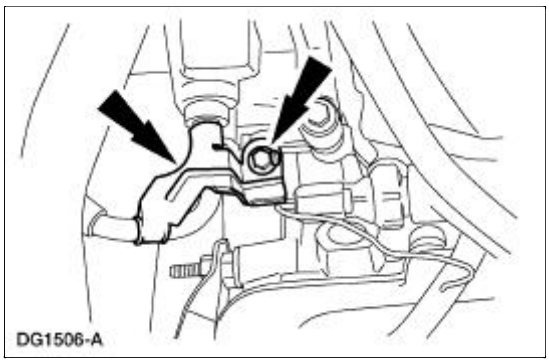
Pump —CIII

Special Tool(s)

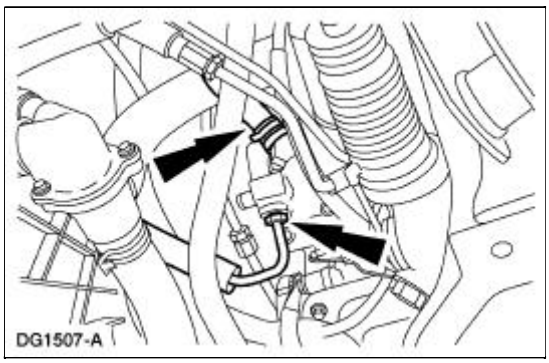
 ST1444-A	Teflon Seal Replacer Set 211-D027 (D90P-3517-A) or equivalent

Removal and Installation

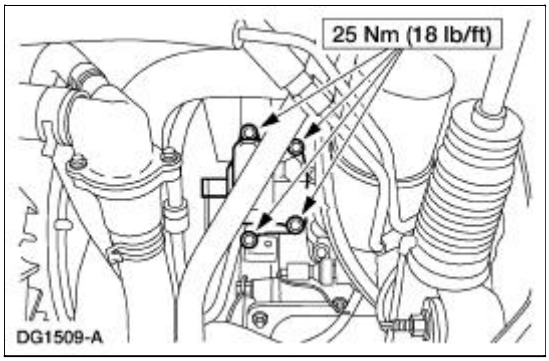
1. Remove the pulley. For additional information, refer to Pulley—CIII Pump in this section.
2. Remove the bolt and bracket.



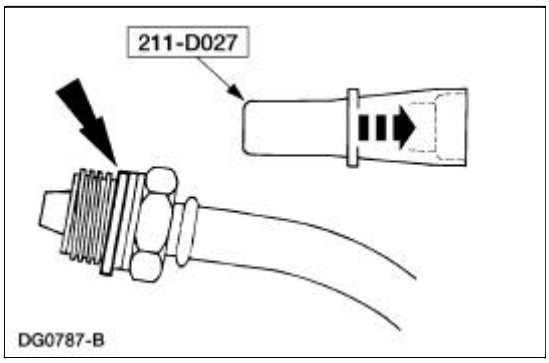
3. Disconnect the power steering hoses. Remove and discard the seal ring.

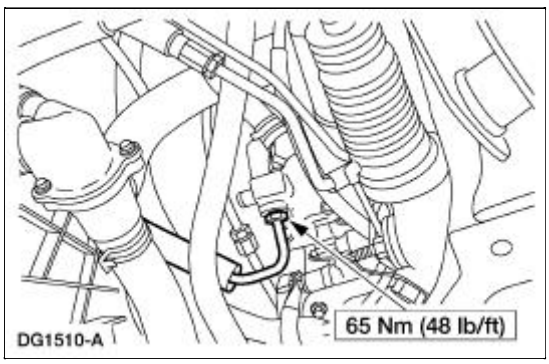


4. Remove bolts and the power steering pump (3A674).



5. To install, reverse the removal procedure.
    - Using the special tool, install a new seal ring.





6. Fill and leak check the power steering system. For additional information, refer to Section 211-00 .

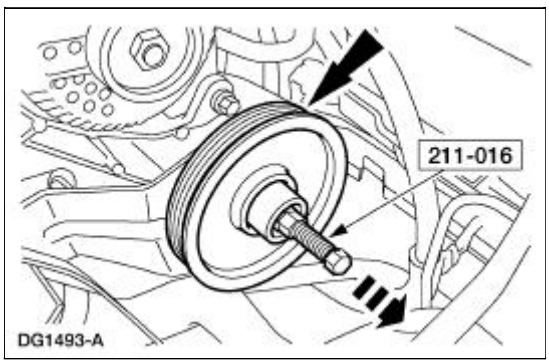
Pulley —CII Pump

Special Tool(s)

	Pump Pulley Installer 211-009 (T65P-3A733-C)
	Pump Pulley Remover 211-016 (T69L-10300-B)

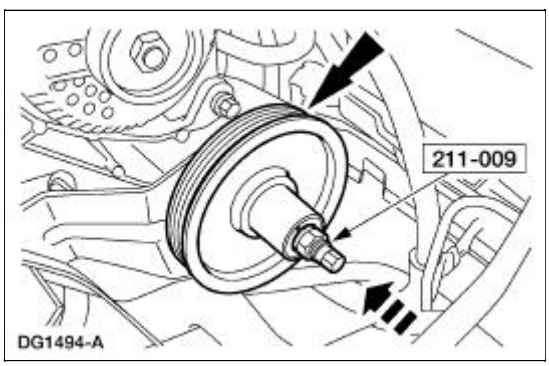
Removal

1. Remove the drive belt. For additional information, refer to Section 303-05 .
2. Using the special tool, remove the pulley.



Installation

1. Using the special tool, install the pulley.



2. Install the drive belt. For additional information, refer to Section 303-05 .

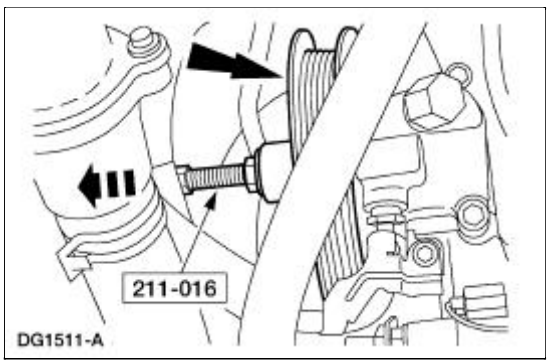
Pulley —CIII Pump

Special Tool(s)

ST1586-A	Pump Pulley Replacer 211-185 (T91P-3A733-A)
	Pump Pulley Remover 211-016 (T69L-10300-B)

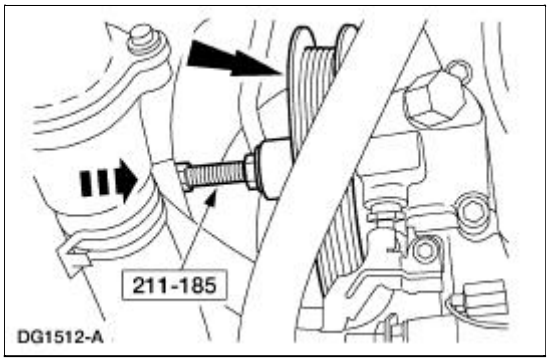
Removal

1. Remove the drive belt. For additional information, refer to Section 303-05 .
2. Raise and support the vehicle. For additional information, refer to Section 100-02 .
3. Using the special tool, remove the pulley.
   - Inspect the pulley for paint marks in the web area near the hub. If there are two paint marks, discard and install a new pulley. If there is no paint or one paint mark, use a paint pencil to mark the web area of the pulley near the hub.



Installation

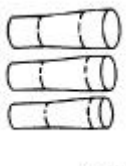
1. Using the special tool, install a new pulley.



2. Install the drive belt. For additional information, refer to Section 303-05 .
3. Lower the vehicle.

Hose

Special Tool(s)

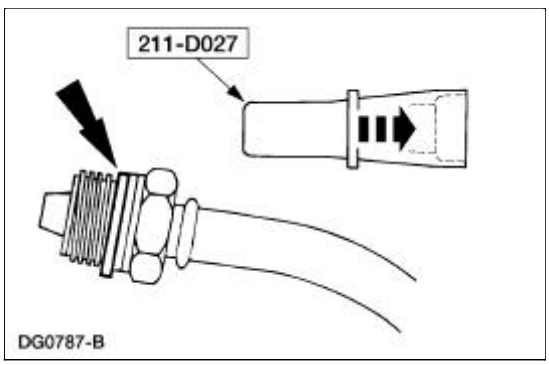
 ST1444-A	Installer Set, Teflon Seal 211-D027 (D90P-3517-A) or equivalent

Removal and Installation

CAUTION: While servicing the power steering system, make sure to plug all open hoses, line fittings, and fluid ports to prevent the entry of contaminants or premature failure of the power steering components can result.

1. Refer to the System View illustration in Description and Operation for the hose routing and retention points.

2. When connecting a fitting with a seal ring, a new seal ring must be installed.
   - The special tool is used to install the return line connector seal and the pressure line connector seal.

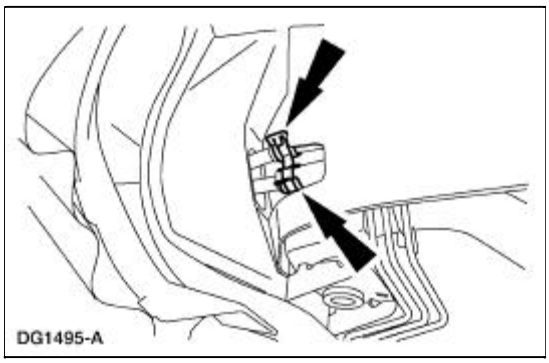


3. Fill, purge and leak check the system. For additional information, refer to Section 211-00 .

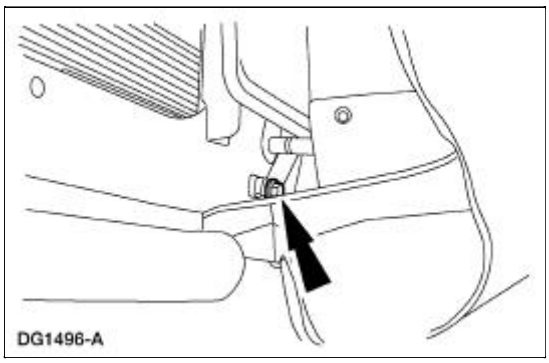
Cooler —Fluid

Removal

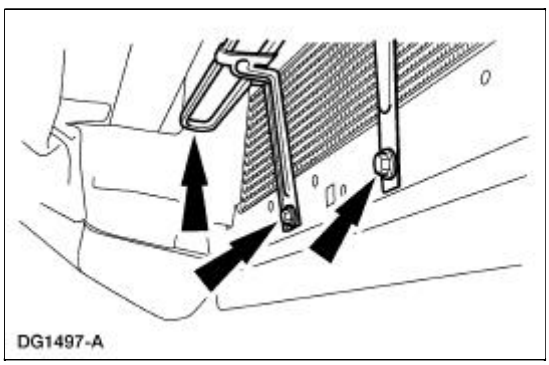
1. Raise and support the vehicle. For additional information, refer to Section 100-02 .
2. Disconnect the power steering hoses.



3. Remove the bolt and routing bracket.



4. Remove the bolts and the power steering fluid cooler.



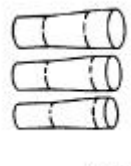
Installation

1. To install, reverse the removal procedure.
2. Fill and leak check the power steering system. For additional information, refer to Section 211-

00 .

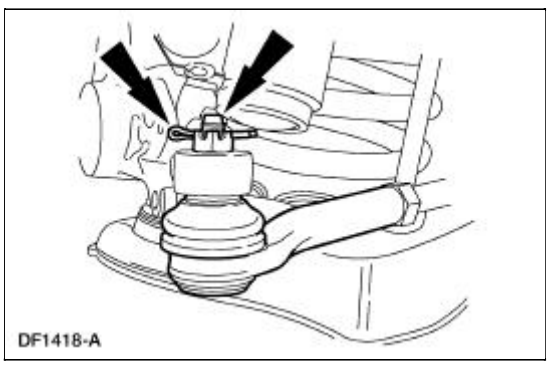
Gear

Special Tool(s)

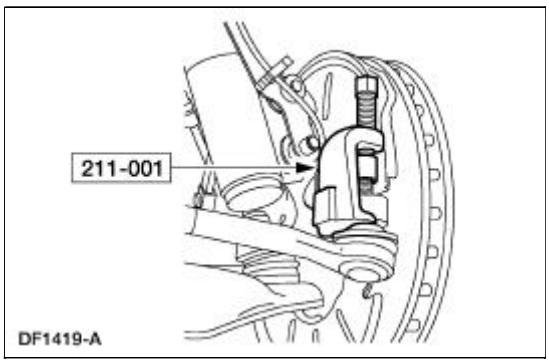
 ST1444-A	Teflon Seal Replacer Set 211-D027 (D90P-3517-A) or Equivalent
ST1106-A	Tie Rod End Remover 211-001 (TOOL-3290-D)

Removal

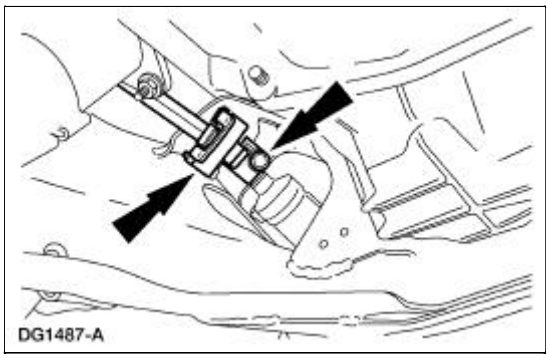
1. Turn the steering wheel as necessary to position the wheels in the straight-ahead position. Do not lock the steering column.
2. Raise and support the vehicle. For additional information, refer to Section 100-02 .
3. Remove the front wheels and tires. For additional information, refer to Section 204-04 .
4. Remove the cotter pin and nut. Discard the cotter pin.



5. Using the special tool, disconnect the tie-rod end.



6. Rotate the steering column intermediate shaft as necessary to access the pinch bolt. Remove and discard the pinch bolt.

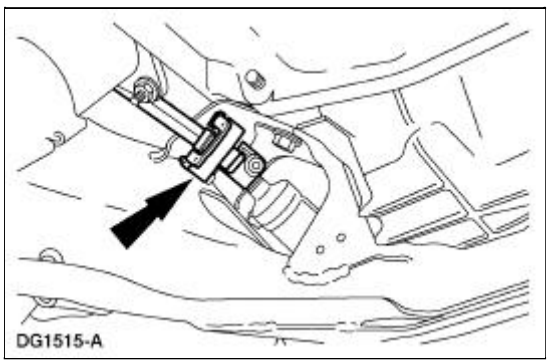


7. Lower the vehicle.

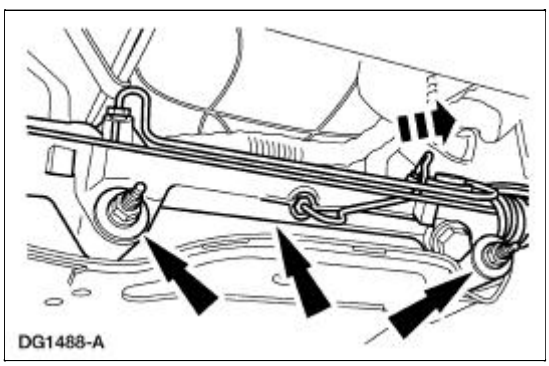
8. Turn the steering wheel back to the straight-ahead position. Turn the ignition key to the locked position.

9. **CAUTION: Do not rotate the steering wheel when the lower steering column shaft is disconnected, or damage to the air bag sliding contact will result.**

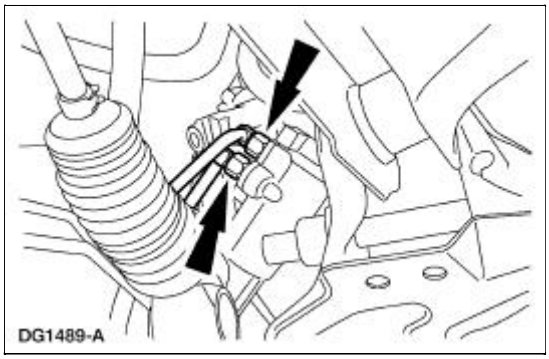
   Disconnect the steering column intermediate shaft coupling (3A525).



10. Remove the nuts, washers and bolts. Position the steering gear (3504) forward.



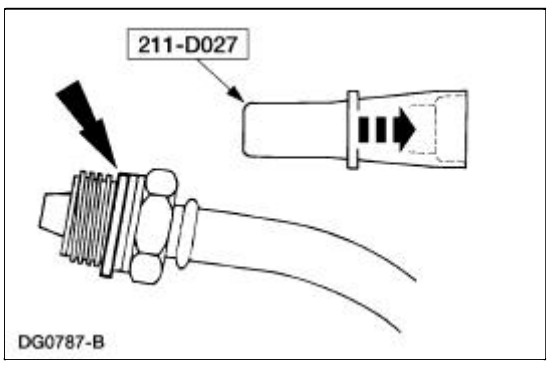
11. Disconnect the power steering hoses. Remove and discard the seal rings.
    - Plug or cap the power steering hoses and steering gear ports to prevent damage and the entry of foreign material.

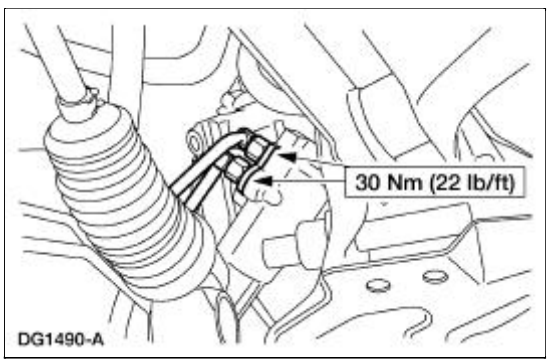


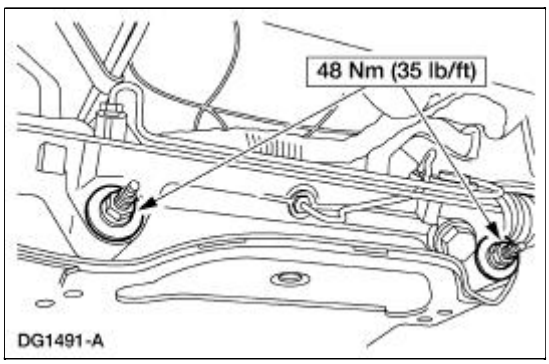
12. Remove the steering gear.

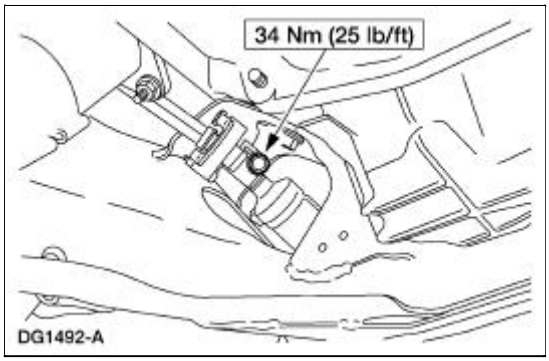
Installation

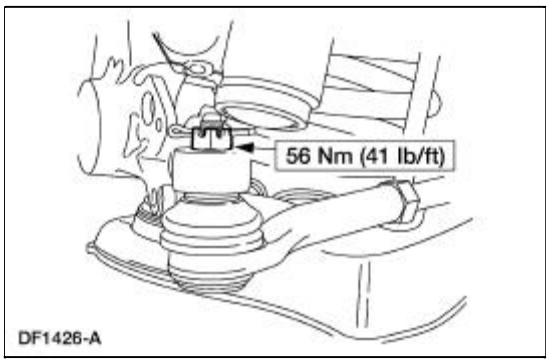
1. To install, reverse the removal procedure.
    - Using the special tool, install a new seal ring.
    - Install a new pinch bolt.











2. Fill and leak check the power steering system. For additional information, refer to Section 211-00 .

Gear

Special Tool(s)

ST2065-A	Head Mounting Fixture 303-D041 (D83L-500-B1) or Equivalent
ST1427-A	Inner Tie Rod Socket Tool 211-D025 (D90P-3290-A) or Equivalent
ST1426-A	Steering Gear Holding Fixture 211-D011 (D87P-3504-B) or Equivalent

Material

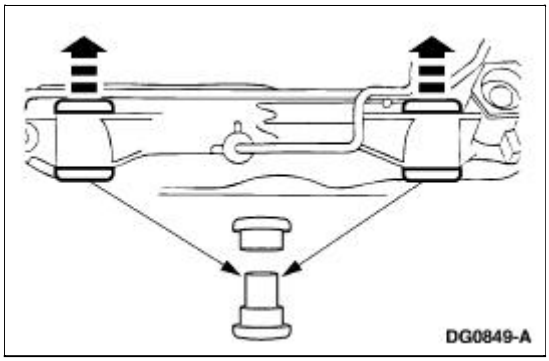
Item	Specification
Multi-Purpose Grease XG-4	ESR-M1C159-A
Silicone Brake Caliper Grease and Dielectric Compound D7AZ-19A331-A	ESE-M1C171-A

Disassembly

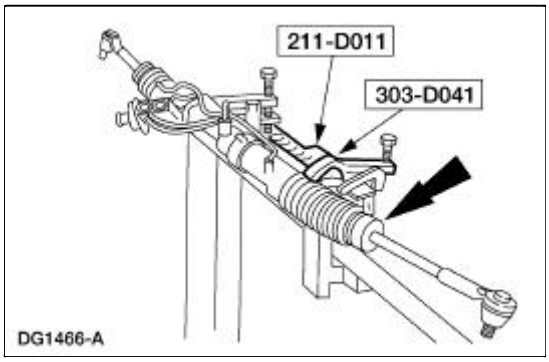
NOTE: The steering gear is serviceable as either a long or short rack assembly. This procedure covers the removal and installation of the components not supplied with a short rack assembly. On short rack assembly only the front wheel spindle tie-rods and front suspension steering ball stud dust seals are serviced separately.

All steering gears

1. Remove the steering gear mounting bracket housing insulators.
    - Discard worn or damaged steering gear mounting bracket housing insulators.



2. Install the steering gear into the special tools.

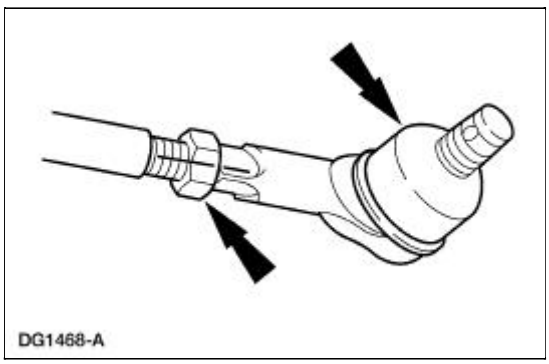


3. Clean the exterior of the steering gear with solvent. If necessary, drain any excess power steering fluid.

4. Inspect the steering gear housing for cracks and other damage. If necessary, install a new steering gear.

5. Verify the power steering gear input shaft bearing rotates freely. If necessary, install a new steering gear.

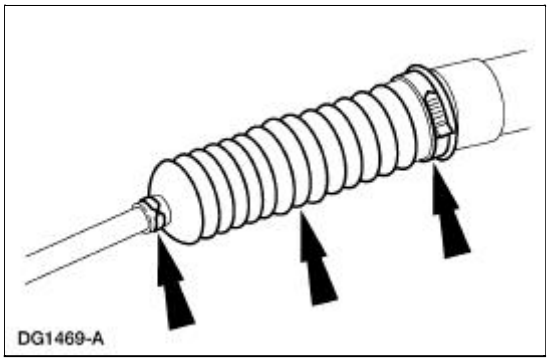
6. Place an alignment mark on the tie-rod ends, nuts and front wheel spindle tie-rods. Remove the tie-rod ends and nuts.



7. **CAUTION: Use care not to damage the front suspension steering ball stud dust seals. If the front suspension steering ball stud dust seals are damaged, this will allow contamination into the steering gear and cause leakage.**

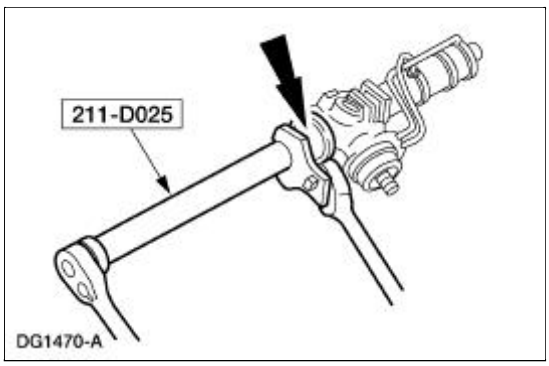
   Remove the clamps and the two front suspension steering ball stud dust seals.

   - Discard any clamps that are damaged or excessively corroded.
   - Discard any front suspension steering ball stud dust seals that are damaged.



8. **CAUTION: Place the steering gear at the center position. Use a crowfoot on the flat of the rack gear to resist rotation and prevent damage to the steering gear during removal and installation of the front wheel spindle tie-rods.**

   Place the steering gear at the center position. Install a crowfoot on the flat of the steering gear. Using the special tool remove the front wheel spindle tie-rods.



Steering gears equipped with travel restrictors

9. **NOTE:** Some steering gears may contain one or two rack travel restrictors on each side of the steering gear. The restrictors are split washers and can be removed if necessary.

   Remove the travel restrictors.

   - Discard any travel restrictors that are heavily worn.

All steering gears

10. Remove the steering gear from the special tools.

Assembly

All steering gears

1. Install the steering gear in the special tools.

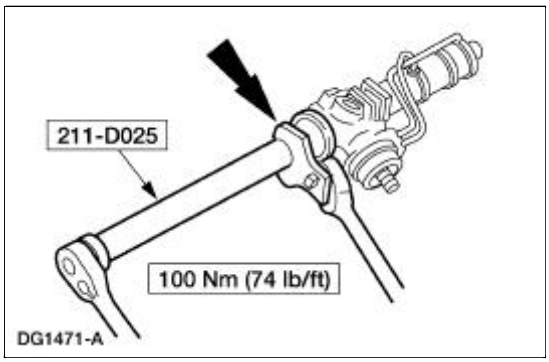
Steering gears equipped with travel restrictors

2. Install the travel restrictors.
   - Install new travel restrictors as necessary.

All steering gears

3. **CAUTION: Place the steering gear at the center position. Use a crowfoot on the flat of the rack gear to resist rotation and prevent damage to the steering gear during removal and installation of the front wheel spindle tie-rods.**

   Place the steering gear at the center position. Install a crowfoot on the flat of the steering gear. Using the special tool install the front wheel spindle tie-rods.

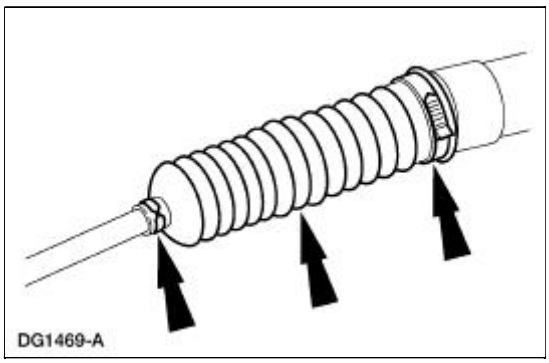


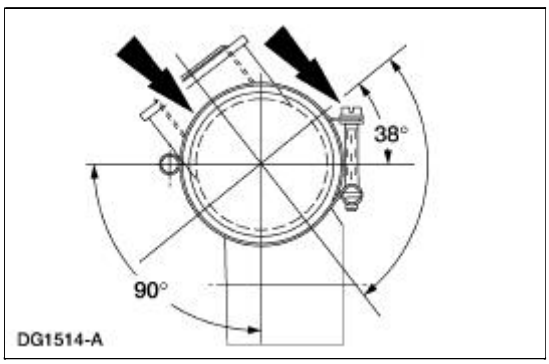
4. Thoroughly clean the steering gear of any foreign material.

5. **CAUTION: Use care not to damage the front suspension steering ball stud dust seals. If the front suspension steering ball stud dust seals are damaged, this will allow contamination into the steering gear and cause leakage.**

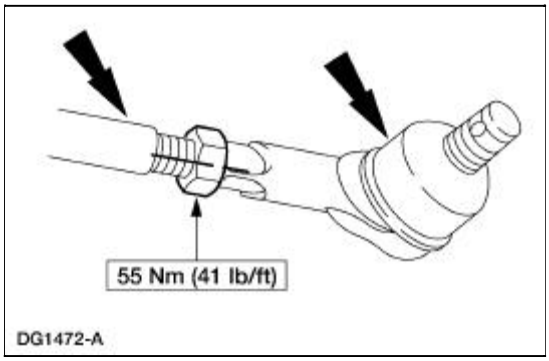
   Install the front suspension steering ball stud dust seals and clamps.

   - Position the front suspension steering ball stud seals and steering gear rack tubes as shown.
   - Install new front suspension steering ball stud dust seals and clamps as necessary.
   - To prevent the front suspension steering ball stud dust seals from twisting during toe adjustment, apply grease to the groove in the front wheel spindle tie-rods and uniformly to the inner-diameter of the front suspension steering ball stud dust seals.



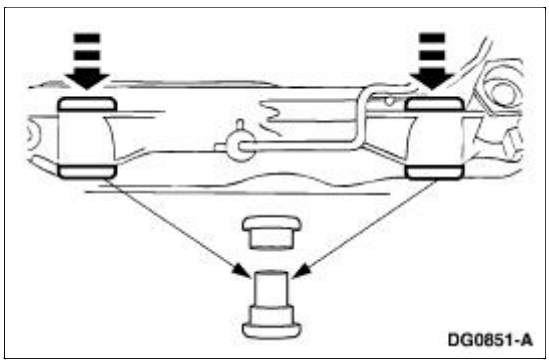


6. Install the nut and the tie-rods ends. Align the marks.
    - Apply silicone dielectric compound to the front wheel spindle tie-rod threads.



7. Remove the steering gear from the special tools.

8. Install the steering gear mounting bracket housing insulators.
    - Install new steering gear mounting bracket housing insulators as necessary.
    - The large end of the metal sleeve must be positioned downward.
    - Check that the mounting surfaces are clean and free of foreign material.



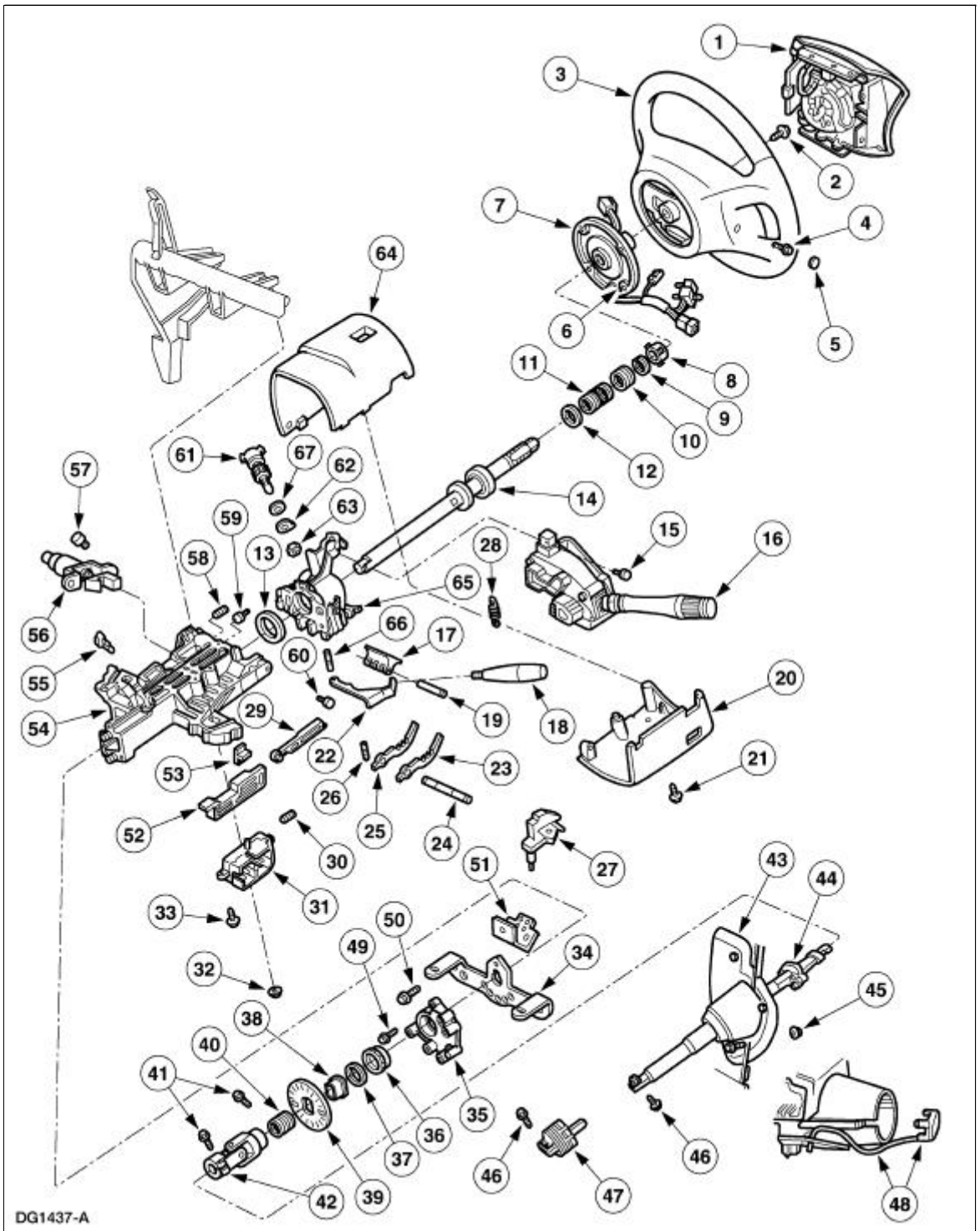
General Specifications

Item	Specification
Lubricant	
Ignition Lock Grease FOAZ-19584-A	ESA-M1C232-A

Torque Specifications

Description	Nm	lb-ft	lb-in
Lock cylinder housing screws	22	17	—
Steering column lower bearing retainer bolts	9	—	80
Ignition switch screws	6	—	53
Multi-function switch screws	3	—	27
Steering wheel bolt	38	28	—
Steering column retaining nuts	15	12	—
Intermediate shaft coupler-to-steering column shaft bolt	25	19	—

Steering Column



Item	Part Number	Description
1	043B13	Driver air bag module
2	N804385-S100	Steering wheel bolt
3	3600	Steering wheel

4	N805572-S36	Air bag module retaining screws (2 req'd)
5	3L518	Steering wheel spoke cover (2 req'd)
6	—	Lock tabs
7	14A664	Clockspring
8	13318	Turn indicator cancel cam
9	3C610	Snap ring
10	3520	Bearing spring
11	3518	Upper bearing sleeve
12	3517	Upper bearing (small)
13	3517	Lower bearing (large)
14	3524	Shaft assembly
15	390345-S36	Screw
16	13K359	Multi-function switch
17	3E695	Lock cam
18	3F609	Tilt wheel handle
19	N806157	Lock cam pivot pin
20	3530	Lower shroud
21	55929	Shroud retaining screws
22	3D544	Release lever
23	3B661	Lock actuator lever (RH)
24	N805856	Lock actuator lever pin
25	3D653	Lock actuator lever (LH)
26	3B664	Lock lever spring (2 req'd)
27	14A099	Wiring shield
28	3D655	Lock lever spring return
29	3E715	Lock lever upper actuator
30	3E696	Lock spring (shaft)
31	11572	Ignition switch
32	N806423-S56	Steering column mounting lower nuts
33	N806584	Screw
34	3E660	Mounting bracket
35	3D681	Bearing retaining
36	3518	Bearing sleeve
37	3517	Lower bearing
38	3L539	Lower bearing tolerance ring
39	3C131	Sensor ring
40	3520	Bearing spring
41	N808349	Bolt — flange yoke
42	3N725	Coupling
43	3C611	Tube boot
44	3B676	Intermediate shaft

45	N621906	Nut
46	N803942	Bolt
47	3A525	Intermediate shaft coupling
48	11A128	Ignition key warning switch terminal
49	N806583	Bearing housing retaining screw
50	N804865-S58	Screw
51	14A06	Wire connector bracket
52	3E715	Lock lever lower actuator
53	3E691	Lock pawl
54	3F723	Actuator housing
55	3E745	Lock actuator cover
56	3F719	Ignition/shifter interlock cable
57	N808124-58M	Screw
58	3D655	Position spring
59	3D656	Tilt flange bumper
60	N806582	Tilt pivot screws
61	11582	Ignition switch lock cylinder
62	3E700	Lock housing bearing
63	3E717	Lock gear
64	3530	Upper shroud
65	3511	Lock cylinder housing
66	N805857	Lock actuator lever pin
67	3D681	Bearing retainer

NOTE: All fasteners are important because they can affect the performance of vital parts and systems. Incorrect installation of the fasteners can result in major repair expenses. They must be installed new with fasteners of the same part number if installation becomes necessary. Do not install a new part of lesser quality or substitute a design. Torque values must be used as specified during assembly to make sure these parts function correctly.

The body of the steering column (3C529) is made of magnesium die castings. The steering column is attached to a support that is an integral part of the instrument panel. The lower attachments of the steering column are through a bracket that bends during collapse. The upper attachments are through plastic shear modules that separate from the main casting during collapse. A clip and washer are attached to the shear modules to reduce steering column shake and to assist in installation of the steering column.

Supplemental Restraint System (SRS) Deactivation and Reactivation

Special Tool(s)

ST2506-A	Diagnostic Tool, Restraint System (2 Req'd) 418-F088 (105-R0012)

Deactivation

WARNING: Always wear safety glasses when repairing an air bag supplemental restraint system (SRS) vehicle and when handling an air bag module. This will reduce the risk of injury in the event of an accidental deployment.

WARNING: After deployment, the air bag surface can contain deposits of sodium hydroxide, a product of the gas generant combustion that is irritating to the skin. Wash your hands with soap and water afterwards.

WARNING: Never probe the connectors on the air bag module. Doing so can result in air bag deployment, which can result in personal injury.

WARNING: Air bag modules with discolored or damaged trim covers must be installed new, not repainted.

WARNING: The restraint system diagnostic tool is for restraint system service only. Remove from vehicle prior to road use. Failure to remove could result in injury and possible violation of vehicle safety standards.

1. **WARNING: To avoid accidental deployment and possible personal injury, the backup power supply must be depleted before repairing or replacing any front or side air bag supplemental restraint system (SRS) components and before servicing, replacing, adjusting or striking components near the front or side air bag sensors, such as doors, instrument panel, console, door latches, strikers, seats and hood latches.**

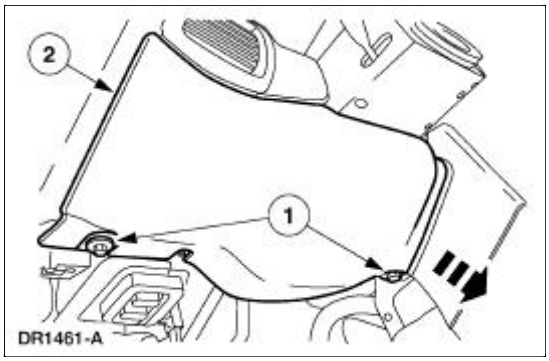
   Please refer to the appropriate vehicle shop manual to determine location of the front air bag sensors.

   The side air bag sensors are located at or near the base of the B-pillar.

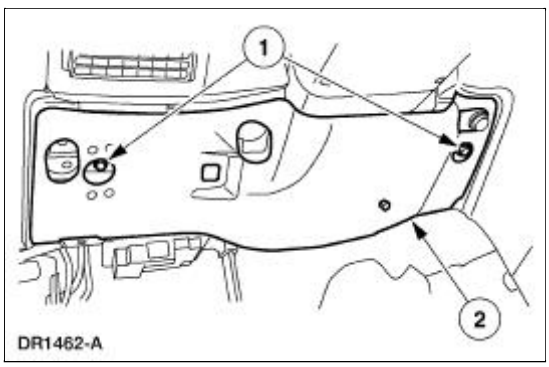
   To deplete the backup power supply energy, disconnect the battery ground cable and wait at least one minute. Be sure to disconnect auxiliary batteries and power supplies (if equipped).

Disconnect the battery ground cable and wait at least one minute. For additional information, refer to Section 414-01 .

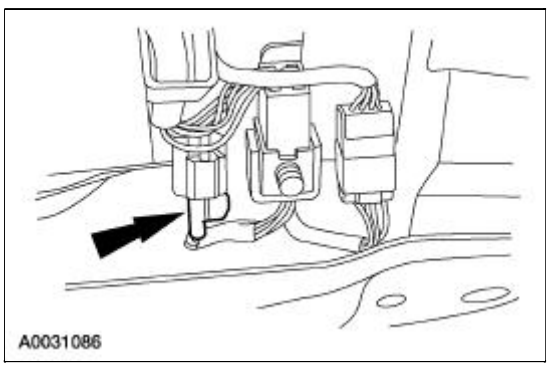
2. Remove the steering column opening lower finish panel.
    1. Remove the screws.
    2. Pull out to release the retaining clips and remove the steering column opening lower finish panel.



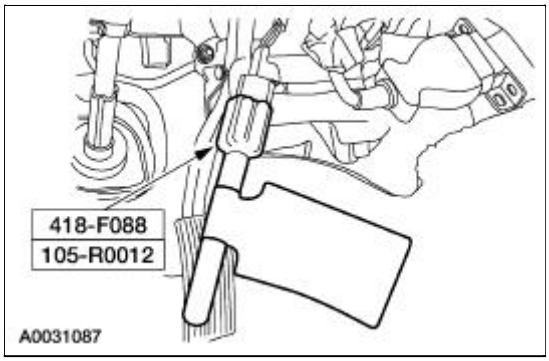
3. Remove the steering column opening lower reinforcement.
    1. Remove the bolts.
    2. Remove the steering column opening lower reinforcement.



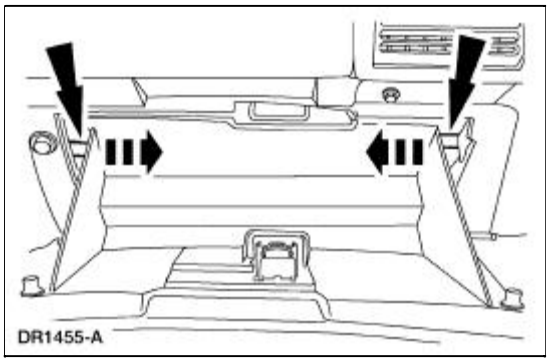
4. Pushing in on the release tab, disconnect the clockspring electrical connector at the base of the steering column.



5. Attach the restraint system diagnostic tool to the vehicle harness side of the clockspring electrical connector.

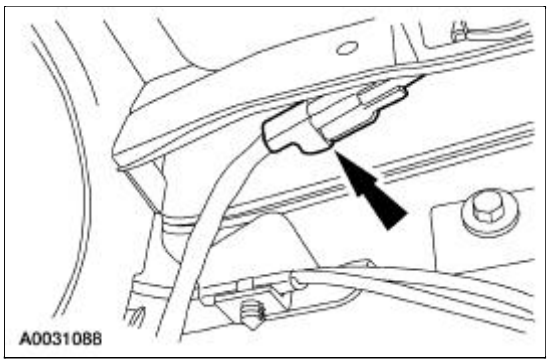


6. Open the glove compartment, push in on the tabs and open the glove compartment door to its fullest extent.

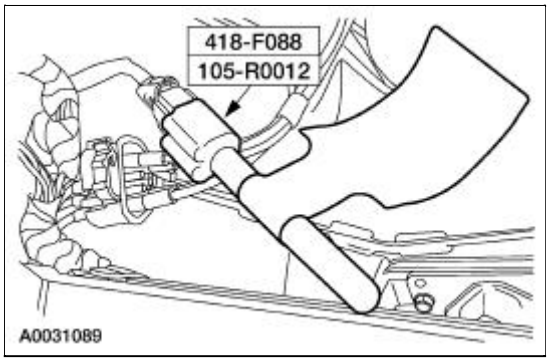


7. Remove the right hand A/C register duct.
    - Remove the two screws retaining the duct to the A/C register.
    - Separate the A/C duct at the air plenum and remove the duct.

8. Disconnect the passenger air bag module.



9. Attach the restraint system diagnostic tool to the vehicle harness side of the passenger air bag electrical connector.



10. Connect the battery ground cable. For additional information, refer to Section 414-01 .

11. With the restraint system diagnostic tools installed at all deployable devices, prove out the supplemental restraint system (SRS). For additional information, refer to Section 501-20B .

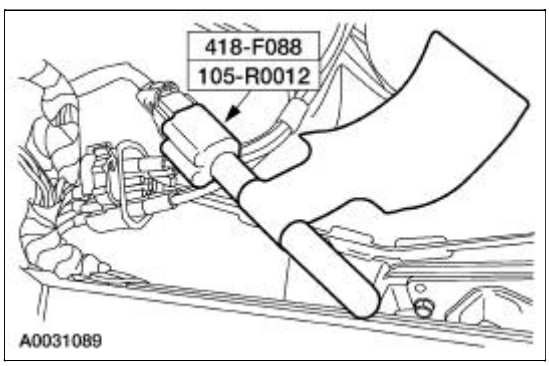
12. Disconnect the battery ground cable and wait at least one minute. For additional information, refer to Section 414-01 .

Reactivation

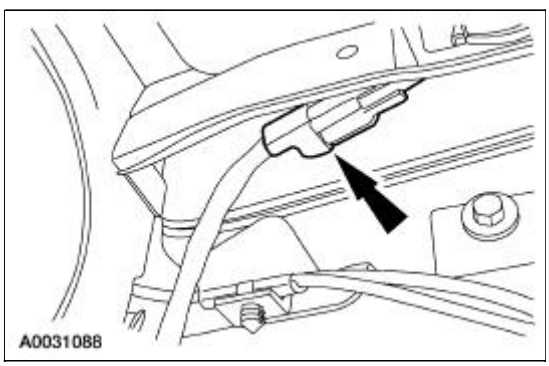
WARNING: To reduce the risk of serious personal injury, read and follow all warnings, cautions, and notes at the beginning of the deactivation procedure.

1. Disconnect the battery ground cable and wait at least one minute. For additional information, refer to Section 414-01 .

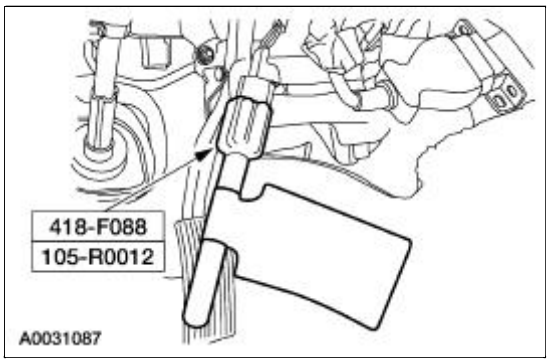
2. Remove the restraint system diagnostic tool from the passenger air bag module electrical connector.



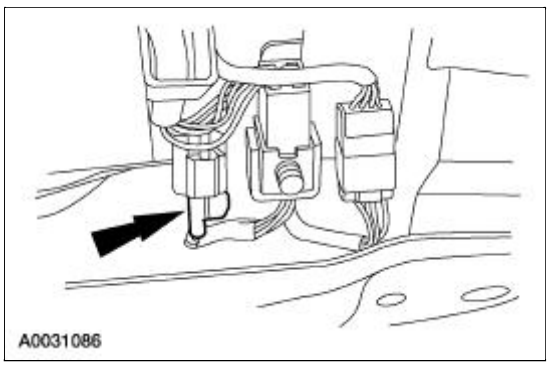
3. Connect the passenger air bag module electrical connector.



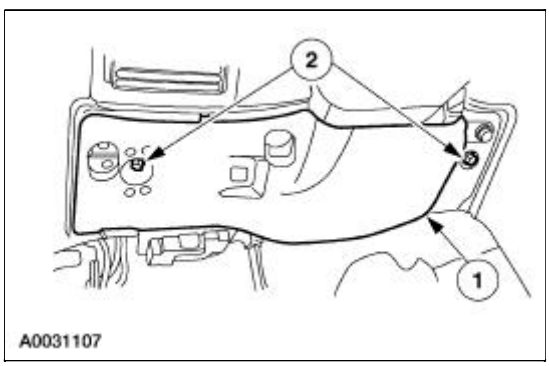
4. Install the right hand A/C register duct.
    - Connect the A/C duct at the air plenum.
    - Install the duct at the A/C register and install the two screws.
5. Close the glove compartment.
6. Remove the restraint system diagnostic tool from the clockspring electrical connector.



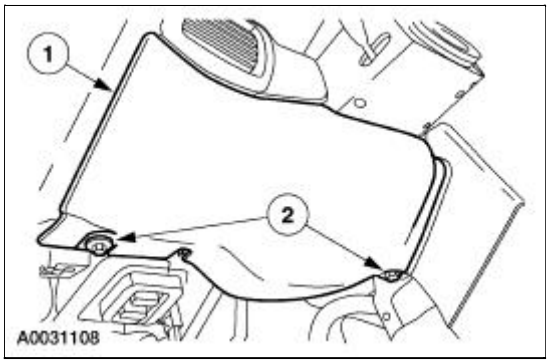
7. Connect the clockspring electrical connector at the base of the steering column.



8. Install the steering column opening lower reinforcement.
    1. Position the steering column opening lower reinforcement.
    2. Install the bolts.



9. Install the steering column opening lower finish panel.
    1. Align the steering column opening lower finish panel and push in, seating the retaining clips.
    2. Install the screws.



10. Connect the battery ground cable. For additional information, refer to Section 414-01 .

11. **WARNING: The restraint system diagnostic tool is for restraint system service only. Remove from vehicle prior to road use. Failure to remove could result in injury and possible violation of vehicle safety standards.**

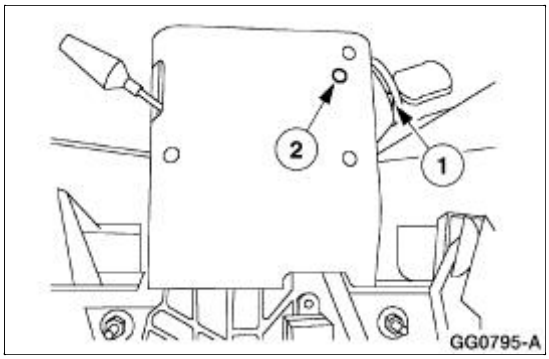
    With all the restraint system diagnostic tools removed, prove out the supplemental restraint system (SRS). For additional information, refer to Section 501-20B .

Ignition Switch Lock Cylinder —Functional

Removal and Installation

1. Disconnect the battery ground cable. For additional information, refer to Section 414-01 .

2. Remove the ignition switch lock cylinder (11582).
    1. Insert the ignition key and turn to the RUN position.
    2. Using a 1/8-inch drift, press the ignition switch lock cylinder release pin through the access hole while pulling out the ignition switch lock cylinder.



3. To install, reverse the removal procedure.
    - Verify ignition switch lock cylinder operation.

Ignition Switch Lock Cylinder —Non-Functional

Removal and Installation

1. **NOTE:** Make sure the front wheels are in the straight-ahead position.

   Disconnect the battery ground cable (14301) and wait at least one minute to allow the depletion of the restraint system backup power supply. For additional information, refer to Section 414-01 .

2. **WARNING: To avoid the risk of serious personal injury, read and follow all warnings, cautions, notes and instructions in the deactivation procedure.**

   Deactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

3. **WARNING: To reduce the risk of serious personal injury, read and follow all warnings, cautions, notes and instructions in the steering wheel removal and installation procedure.**

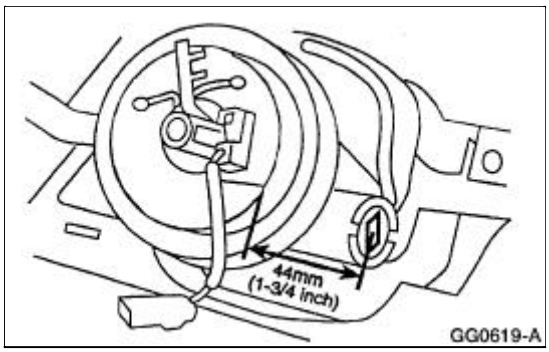
   Remove the steering wheel assembly. For additional information, refer to Wheel in this section.

4. Twist off the cap from the ignition switch cylinder.

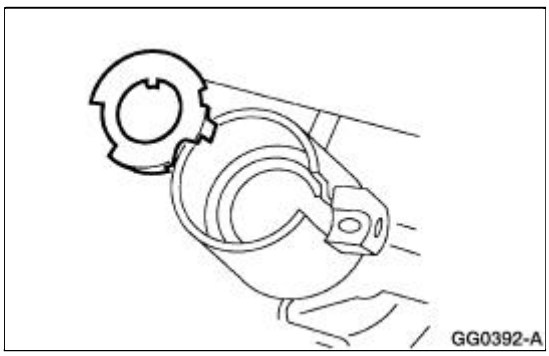
5. **NOTE:** The lock cylinder is repaired by discarding the inoperative lock cylinder and building a new lock cylinder using the appropriate lock repair package (F85Z-11582-AA). The lock repair package includes a detailed instruction sheet to build the new lock cylinder to the current key code of the vehicle.

Remove the ignition switch lock cylinder.

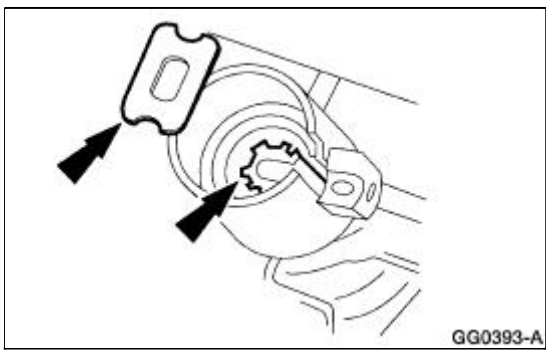
- Use a 1/8-inch diameter drill bit to drill out the lock cylinder retaining pin.
- Use a 3/8-inch drill bit to drill down the middle of the ignition lock key slot until the ignition switch lock cylinder breaks loose.
- Remove and discard the ignition switch lock cylinder and clean the drill shavings from the steering column.



6. Remove the bearing retainer.



7. Remove the bearing and gear.
   - Thoroughly clean all drill shavings from the steering column and inspect it for damage.



8. To install, reverse the removal procedure.
   - Install a new ignition switch lock cylinder.
   - Verify ignition switch lock cylinder operation.

9. **WARNING: To avoid the risk of serious personal injury, read and follow all warnings, cautions, notes and instructions in the reactivation procedure.**

   Reactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

Wheel

Removal and Installation

1. Disconnect the battery ground cable (14301) and wait at least one minute to allow the depletion of the restraint system backup power supply. For additional information, refer to Section 414-01 .

2. Turn the steering wheel to the straight-ahead position and the ignition switch to the OFF position.

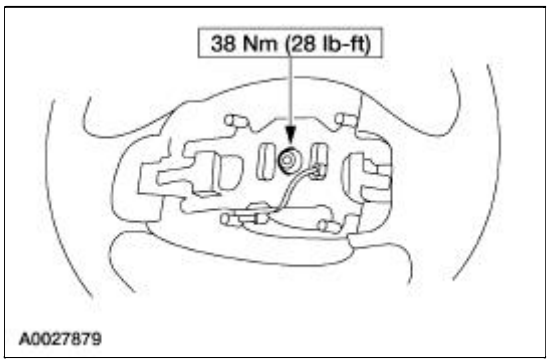
3. **WARNING: To avoid the risk of serious personal injury, follow all warnings, cautions, notes and instructions in the beginning of the deactivation procedure.**

   Deactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

4. **WARNING: To avoid risk of serious personal injury, follow all warnings, cautions, notes and instructions in the driver air bag removal and installation procedure.**

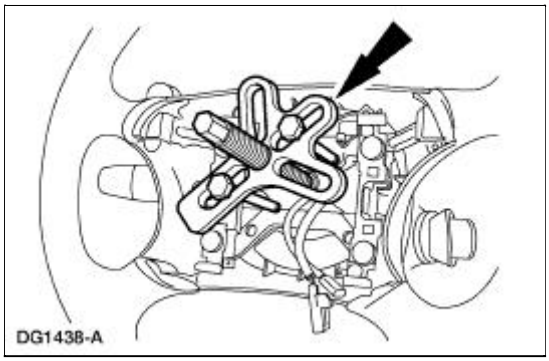
   Remove the driver air bag module. For additional information, refer to Section 501-20B .

5. Remove and discard the steering wheel retaining bolt.



6. **CAUTION: Removing the steering wheel without using a puller can damage the column bearings.**

   Use a suitable puller to remove the steering wheel (3600).



7. Remove the steering wheel while routing the wires from the clockspring through the steering wheel.

8. To install, reverse the removal procedure.

9. **WARNING: To avoid the risk of serious personal injury, follow all warnings, cautions, notes and instructions at the beginning of the reactivation procedure.**

   Reactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

Column

Removal and Installation

All vehicles

1. Disconnect the battery ground cable and wait at least one minute to allow the depletion of the restraint system backup power supply. For additional information, refer to Section 414-01 .

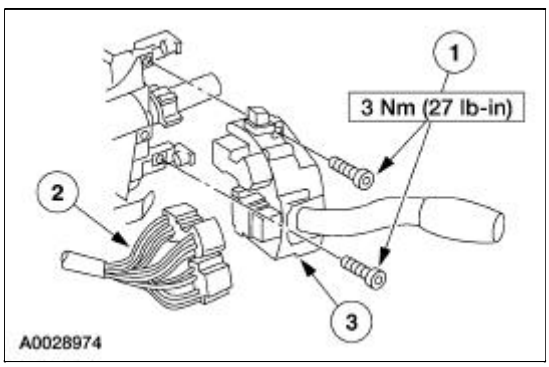
2. **WARNING: To avoid the risk of serious personal injury, follow all warnings, cautions, notes and instructions at the beginning of the deactivation procedure.**

   Deactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

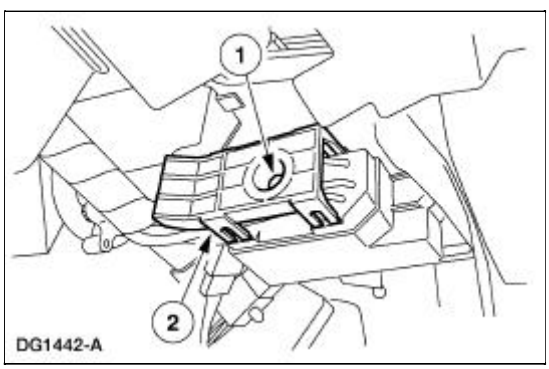
3. **WARNING: To reduce the risk of serious personal injury, follow all warnings, cautions, notes and instructions in the clockspring removal and installation procedure.**

   Remove the clockspring (14A664). For additional information, refer to Section 501-20B .

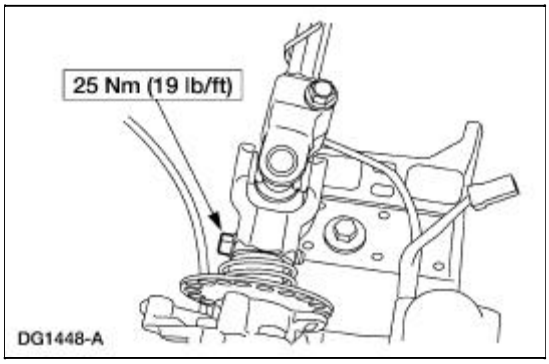
4. Remove the multi-function switch (13K359).
   1. Remove the screws.
   2. Disconnect the electrical connector.
   3. Remove the multi-function switch.



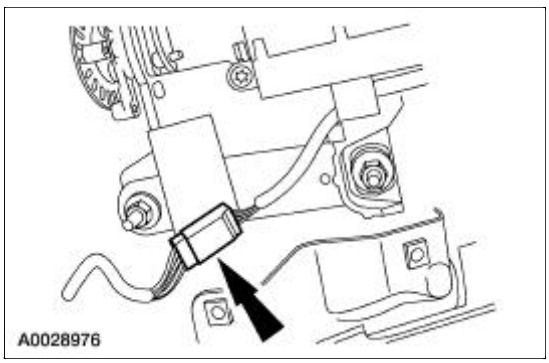
5. Disconnect the ignition switch electrical connector.
   1. Remove the bolt.
   2. Disconnect the electrical connector.



6. Remove the pinch bolt and disconnect the coupling from the steering column.

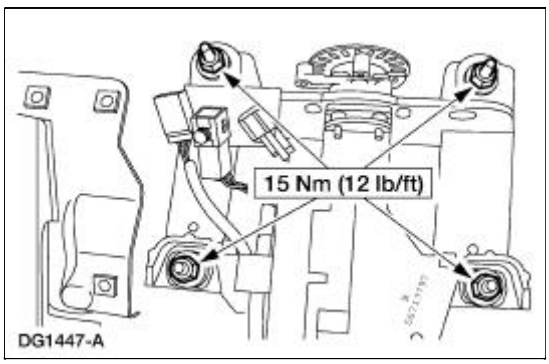


7. Disconnect the electrical connector.



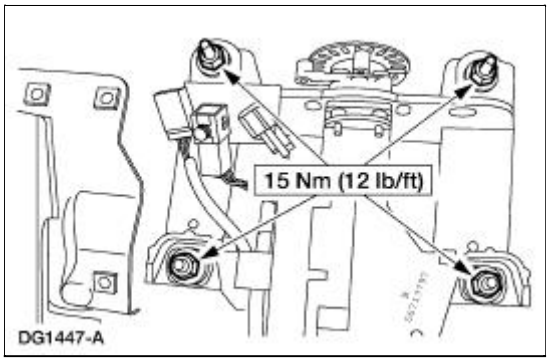
Vehicles with manual transmission

8. Remove the nuts and the steering column.
    - Discard the nuts.

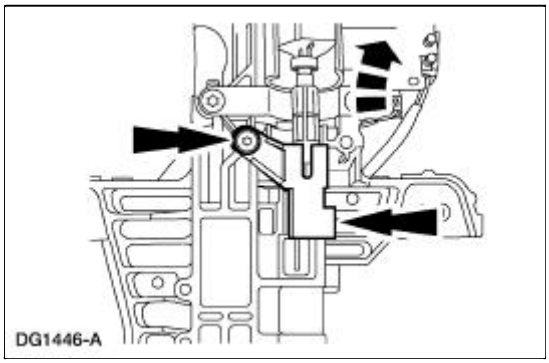


Vehicles with automatic transmission

9. Remove the nuts and lower the steering column.
    - Discard the nuts.



10. Disconnect the ignition/shifter interlock and remove the steering column.



All vehicles

11. To install, reverse the removal procedure.

12. **WARNING: To avoid the risk of serious personal injury, follow all warnings, cautions, notes and instructions at the beginning of the reactivation procedure.**

    Reactivate the supplemental restraint system (SRS). For additional information, refer to Supplemental Restraint System (SRS) Deactivation and Reactivation in this section.

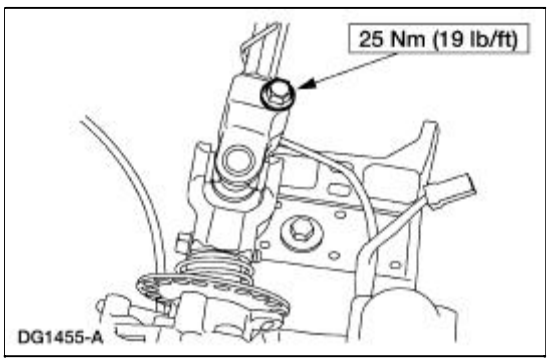
Steering Column Shaft

Removal and Installation

1. **CAUTION: Do not allow the steering column shaft to rotate while intermediate shaft is disconnected or damage to the clockspring can result. If there is evidence that the steering column shaft has rotated the clockspring must be removed and recentered. For additional information, refer to Section 501-20B .**

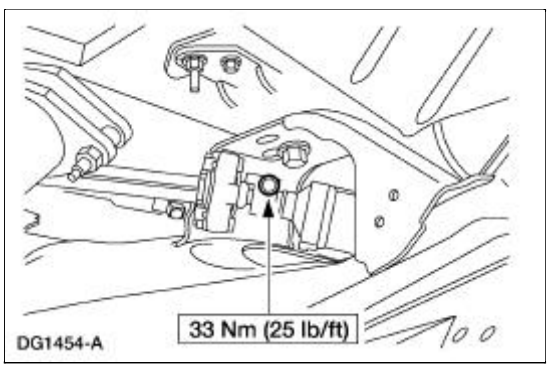
   NOTE: Discard the steering column shaft pinch bolt and the lower intermediate shaft-to-steering gear pinch bolt. Do not reuse, install new bolts.

   Remove and discard the steering column shaft pinch bolt and disconnect the intermediate from the coupling.

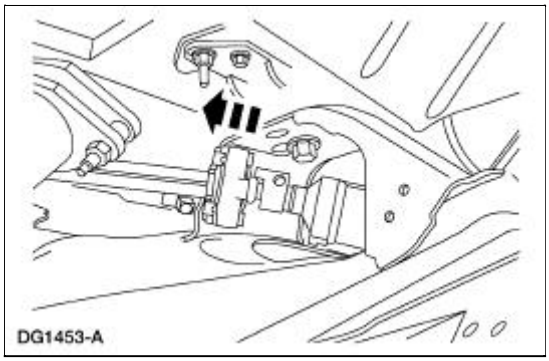


2. Raise and support the vehicle. For additional information, refer to Section 100-02 .

3. Remove the pinch bolt.



4. Disconnect the intermediate shaft from the gear and remove the intermediate shaft.



5. To install, reverse the removal procedure.

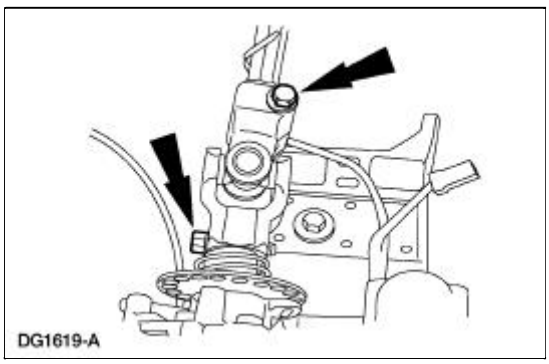
Coupling

Removal and Installation

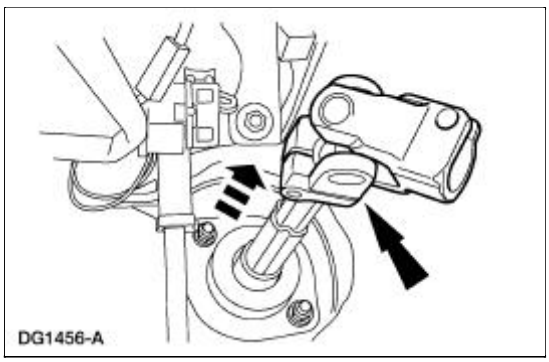
1. **CAUTION: Do not allow the steering column shaft to rotate while intermediate shaft is disconnected or damage to the clockspring can result. If there is evidence that the steering column shaft has rotated the clockspring must be removed and recentered. For additional information, refer to Section 501-20B .**

   NOTE: Discard the steering column shaft pinch bolt and the lower intermediate shaft-to-steering gear pinch bolt upon removal. Do not reuse, install new bolts.

   Remove the pinch bolts and disconnect the coupling from the column.



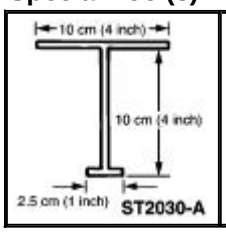
2. Remove the coupling.



3. To install, reverse the removal procedure.

Steering Column

Special Tool(s)

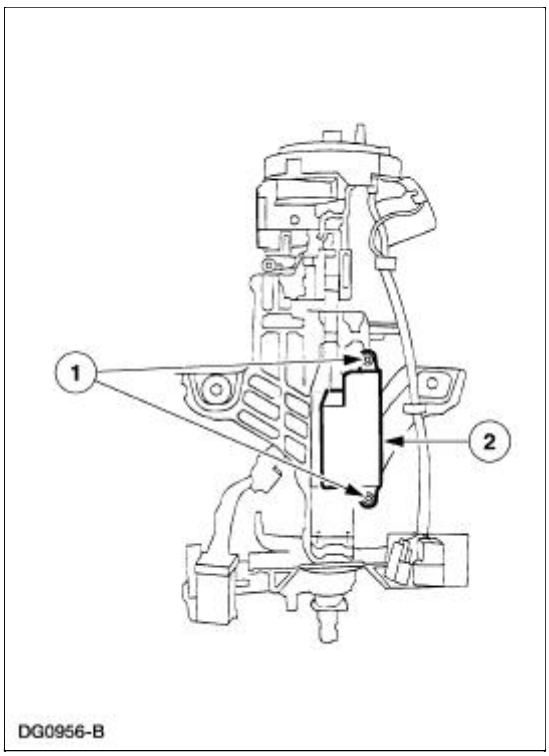
	Steering Column Locking Lever Tool (Shop Fabricated)

Disassembly

1. **WARNING: To avoid risk of serious personal injury, follow all warnings, cautions, notes and instructions in the driver air bag removal and installation procedure.**

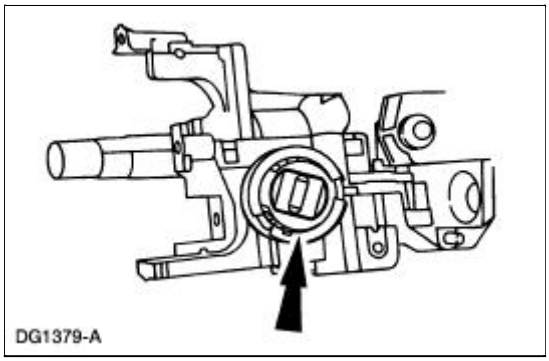
   Remove the steering column (3C529). For additional information, refer to Column in this section.

2. Remove the ignition switch (11572).
   1. Remove the screws.
   2. Remove the ignition switch.

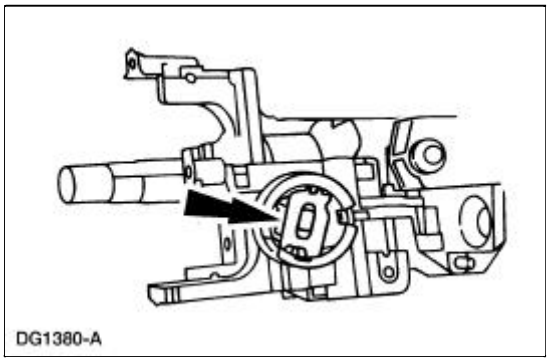


3. **CAUTION: Carefully note the position of the steering column lock gear, bearing and retainer prior to removal.**

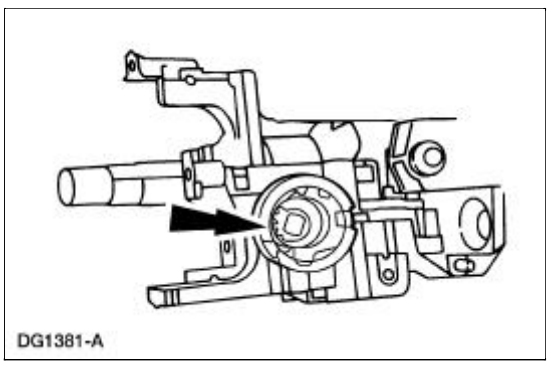
   Remove the bearing retainer (3D681).



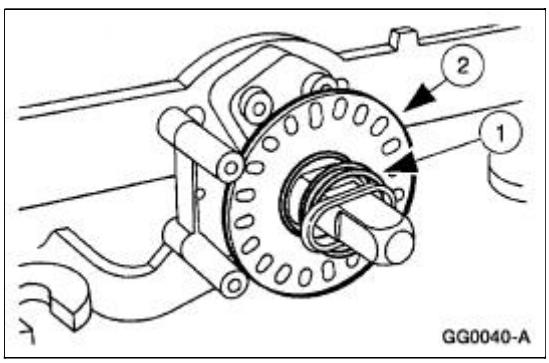
4. Remove the lock housing bearing (3E700).



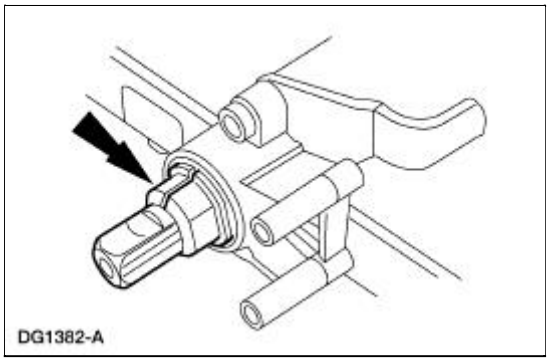
5. Remove the lock gear (3E717).



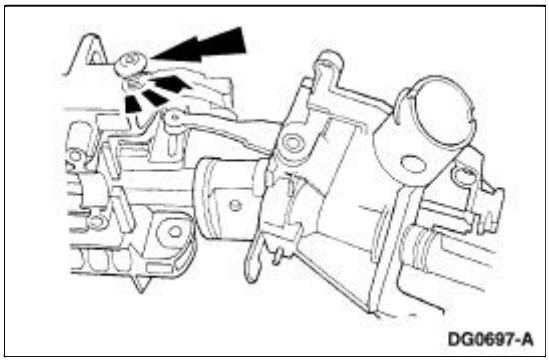
6. Remove the sensor ring.
    1. Remove the lower bearing spring.
    2. Remove the sensor ring.



7. Remove the lower bearing tolerance ring from the shaft.

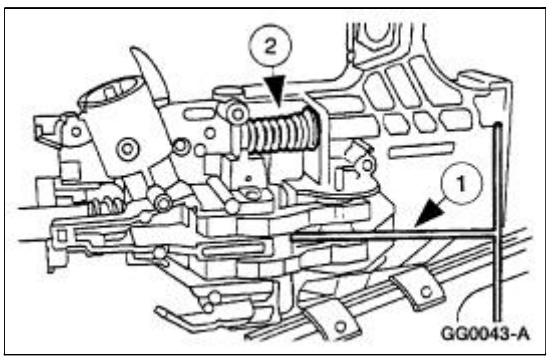


8. Remove the two tilt pivot screws.

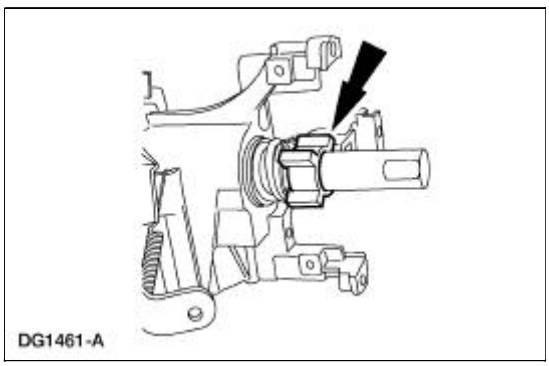


9. **WARNING: Steering column position spring is under tension and can come out with great force.**

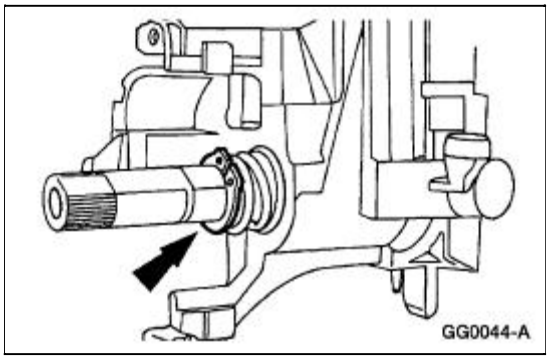
   Remove the lock cylinder housing and shaft assembly from the actuator housing (3F723).
   1. Pry up on the lock actuator lever (LH) (3D653) using a shop fabricated tool.
   2. Remove the position spring (3D655).



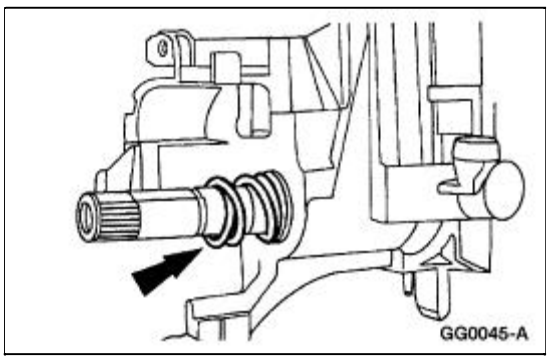
10. Remove the turn indicator cancel cam.



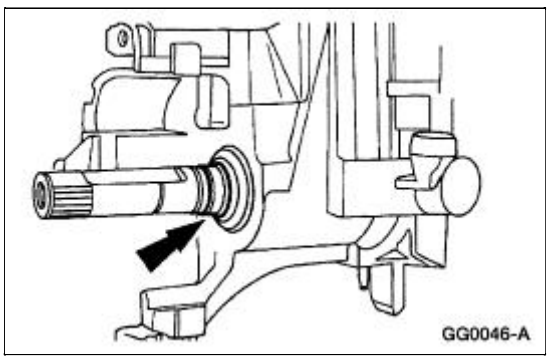
11. Remove the snap ring.



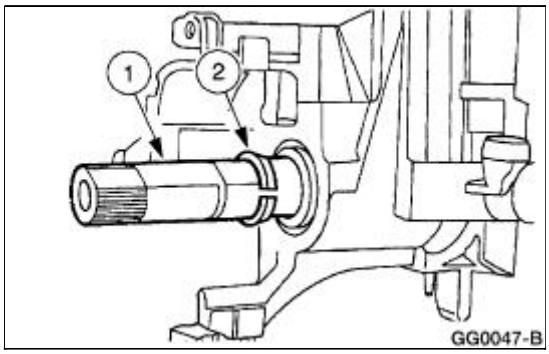
12. Remove the upper bearing spring (3520).



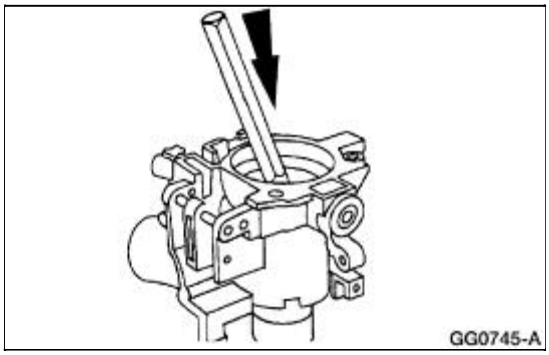
13. Remove the bearing sleeve (3518).



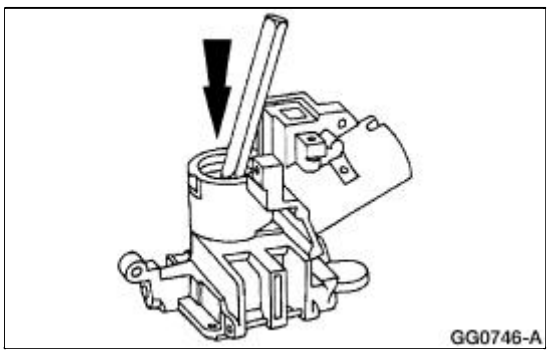
14. Remove the lower bearing tolerance ring (3L539).
    1. Slide the steering column shaft in toward the lock cylinder housing (3511).
    2. Slide the steering column bearing tolerance ring from the steering column shaft and remove the shaft.



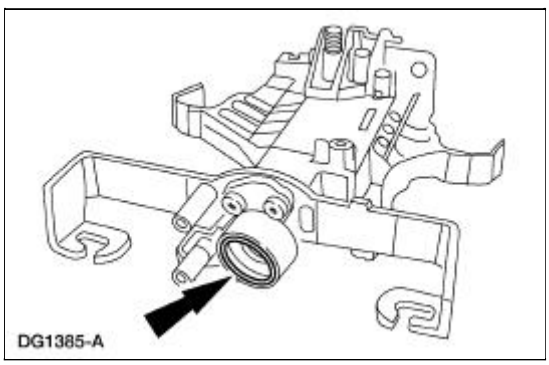
15. Using a suitable punch, remove the lower bearing (3517) from the lock cylinder housing.



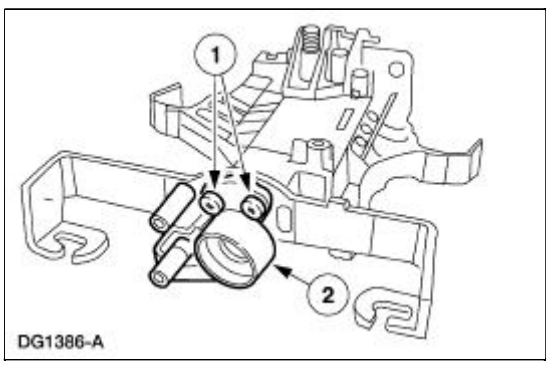
16. Use a suitable punch to remove the bearing from the lock cylinder housing.



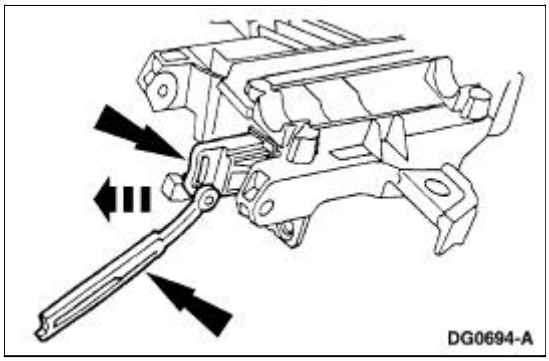
17. Remove the lower bearing and sleeve.



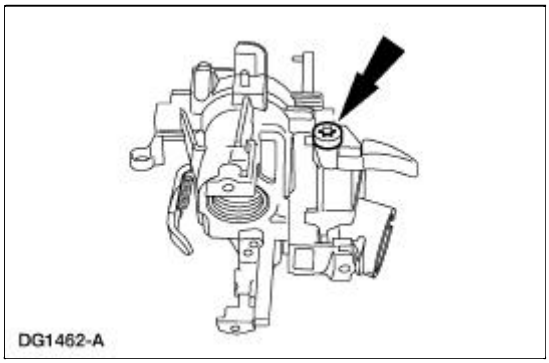
18. Remove the lower bearing retainer (3D681).
    1. Remove the three bolts.
    2. Remove the lower bearing retainer.



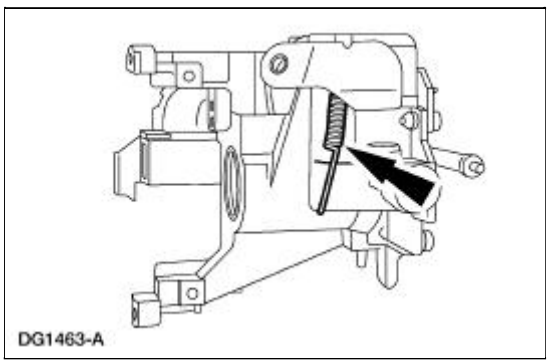
19. Remove the upper lock lever actuator (3E715) and the lower lock lever actuator.



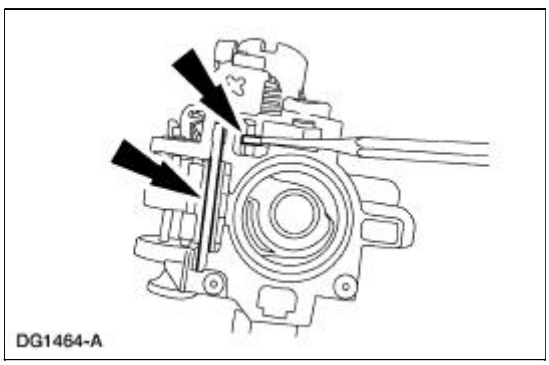
20. Remove the ignition lock cylinder lockout lever.



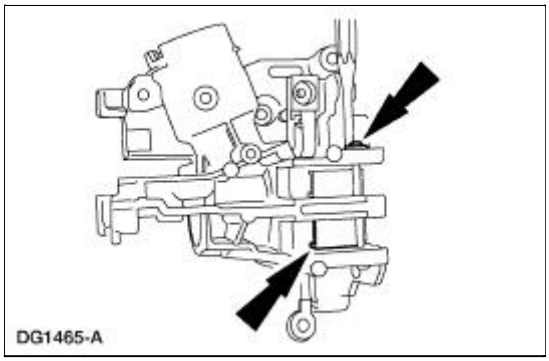
21. Remove the lock actuator lever return spring.



22. Using a pin punch, remove the pin and lock actuator lever.

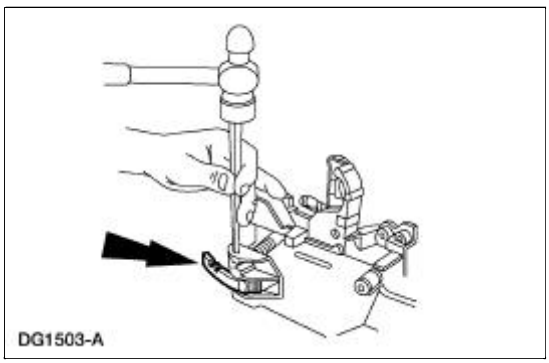


23. Using a pin punch, remove the pin and locking lever cam.



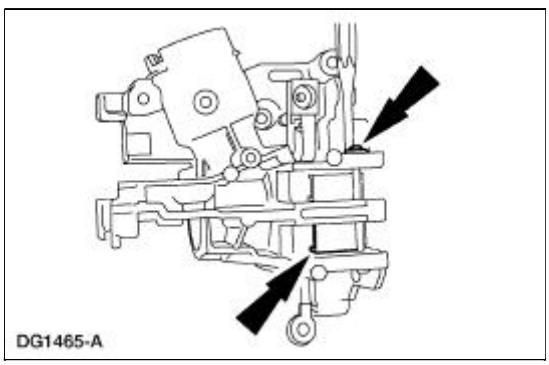
24. **NOTE:** Do not remove the tilt lock levers if not required.

    Using a pin punch, remove the pin, tilt locking levers and springs.

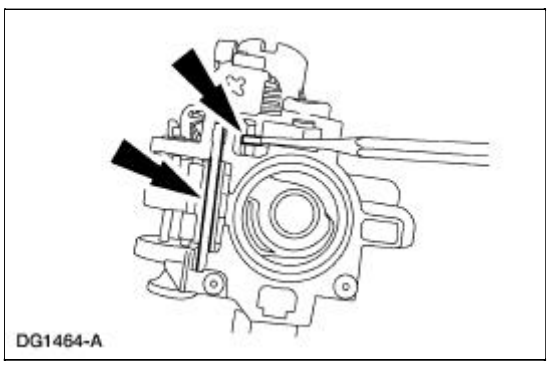


Assembly

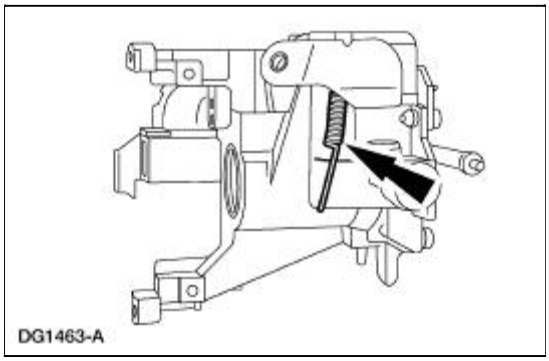
1. Install the locking lever cam and pin.



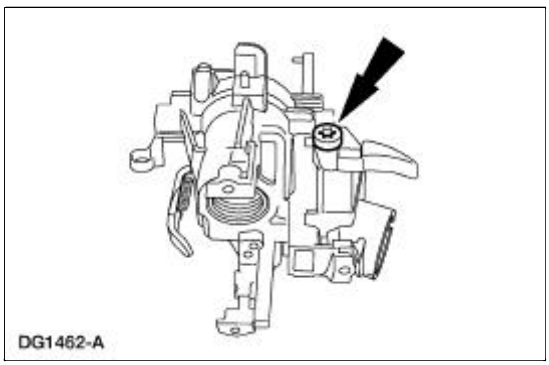
2. Install the lock actuator lever and pin.



3. Install the lock actuator lever return spring.

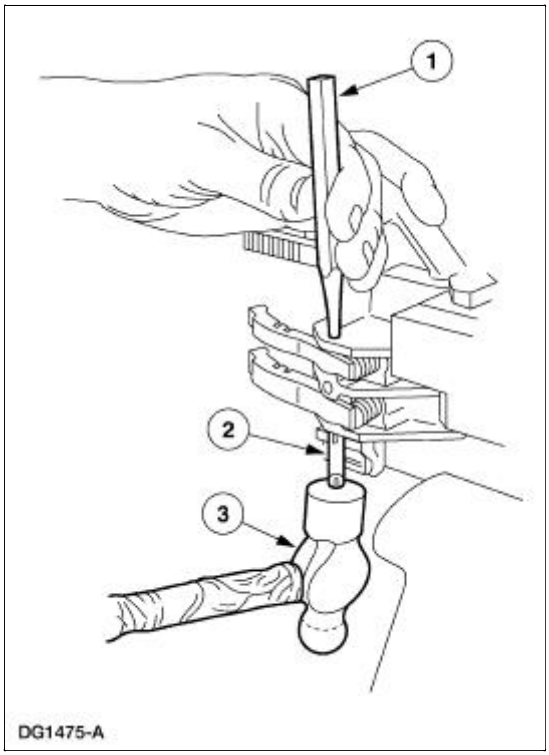


4. Install the ignition lock cylinder lockout lever.

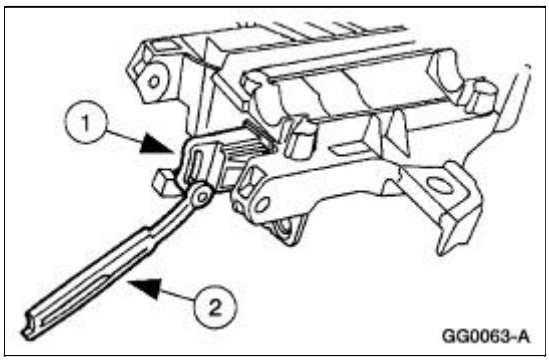


5. **NOTE:** The lock lever with two teeth is installed on the left-hand side.

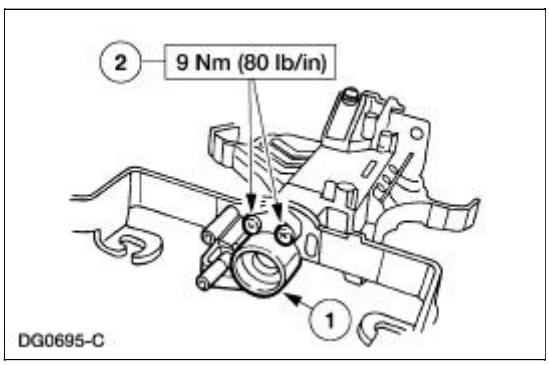
   If necessary, install the springs and lock levers.
   1. Install the spring and lever on the left-hand side. Use a pin punch to hold the compressed spring in position.
   2. Install the spring and lever on the right-hand side. Use the pivot pin to hold the compressed spring in position.
   3. Tap the pin through the levers, pushing out the pin punch, until flush with the housing.



6. Install the lock lever actuators.
    1. Lubricate the lock lever actuator with Ignition Lock Grease F0AZ-19584-A or equivalent meeting Ford specification ESA-M1C232-A.
    2. Install the lock lever actuators.

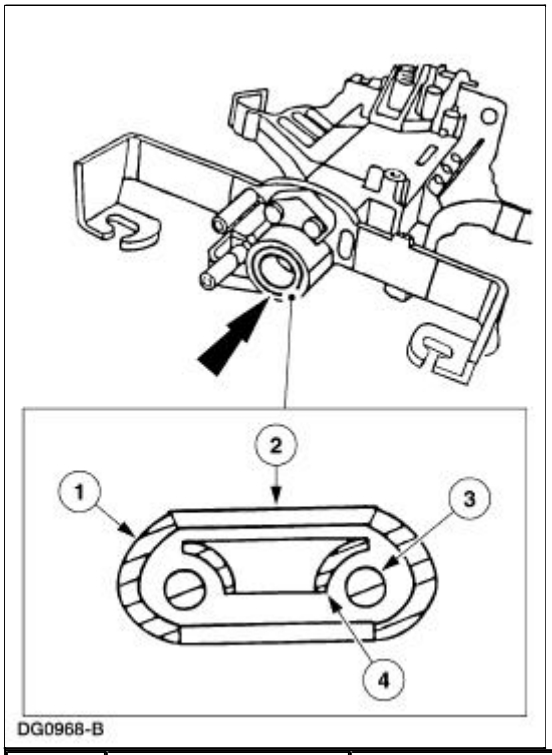


7. Install the lower bearing retainer.
    1. Position the lower bearing retainer.
    2. Install the three bolts.



8. **NOTE:** The "UP" position of the bearing must be facing forward.

Install the lower bearing and sleeve.

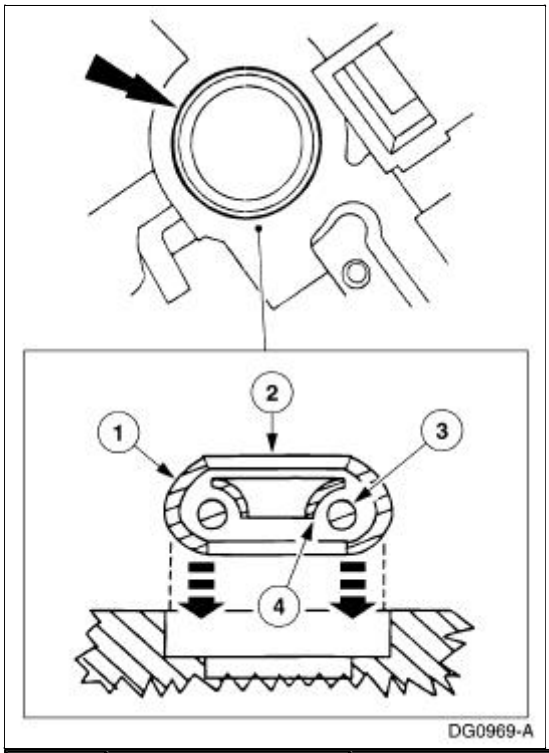


Item	Part Number	Description
1	—	Outer race
2	3517	Bearing (in the "UP" position)
3	—	Ball
4	—	Inner race

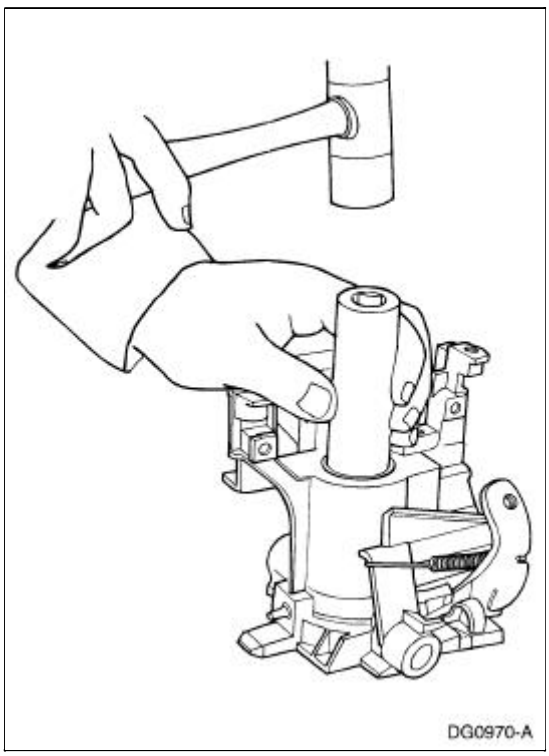
9. **CAUTION: Install the steering column bearing so that the inner race is visible when installed.**

   NOTE: Use an appropriate bearing installer or socket.

   Install the bearing in the lock cylinder housing.



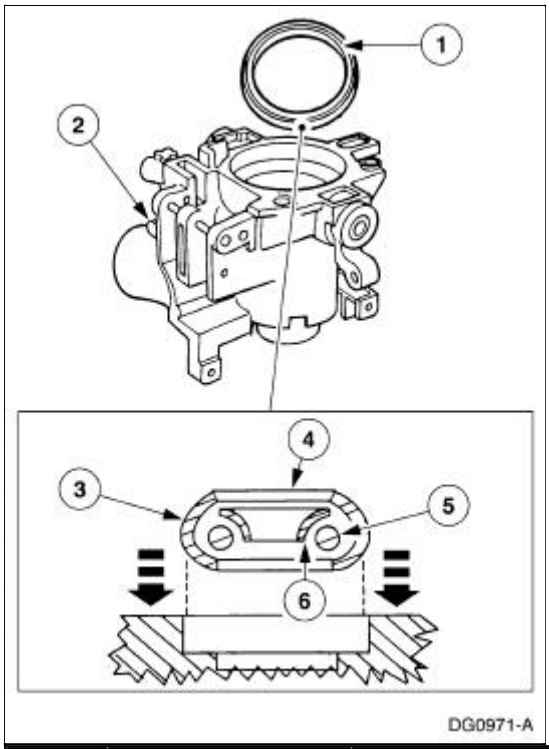
Item	Part Number	Description
1	—	Outer race
2	—	Bearing (in the "UP" position)
3	—	Ball
4	—	Inner race



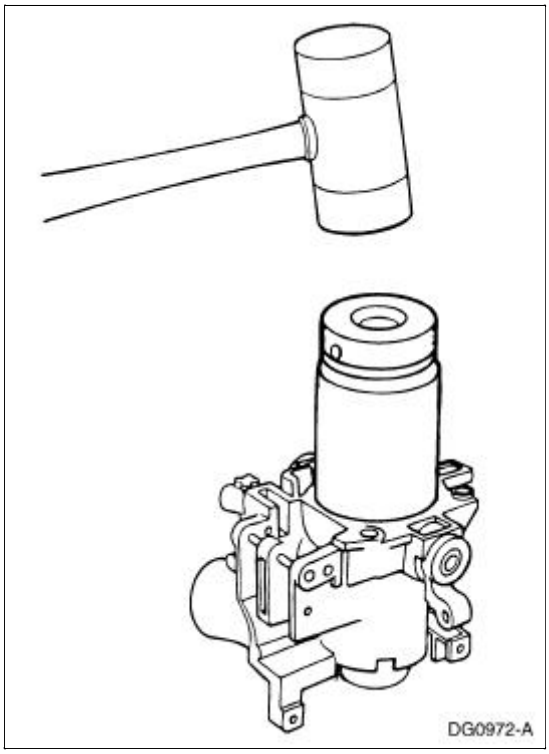
10. **CAUTION: Install the steering column bearing so that the inner race is visible when installed.**

NOTE: Use an appropriate bearing installer or socket.

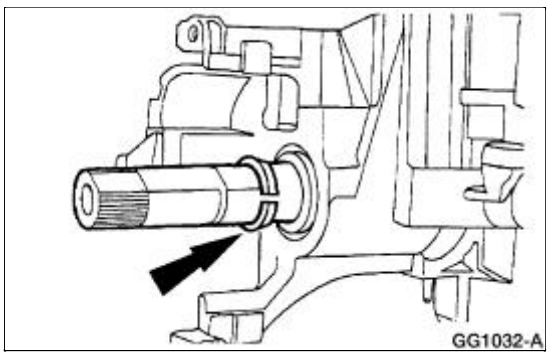
Install the bearing in the lock cylinder housing.



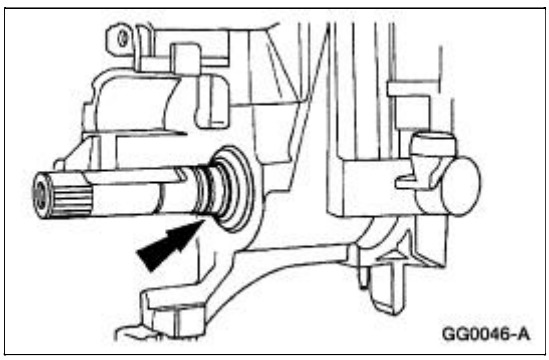
Item	Part Number	Description
1	—	Bearing slot
2	3511	Lock cylinder housing
3	—	Outer race
4	—	Bearing (in the "UP" position)
5	—	Ball
6	—	Inner race



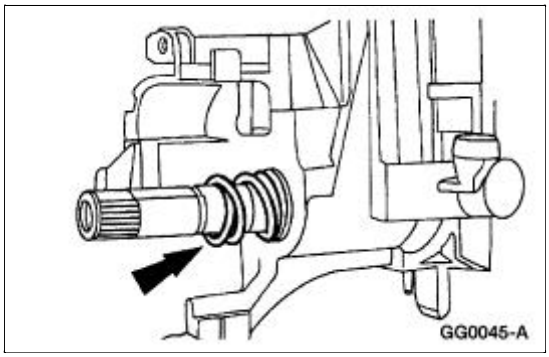
11. Position the shaft in the steering column lock cylinder housing.
    - Install the bearing tolerance ring on the steering column shaft.



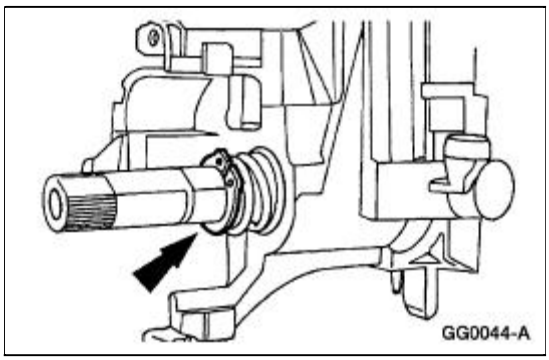
12. Install the bearing sleeve.



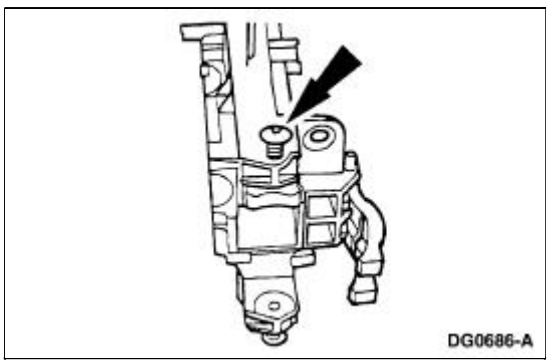
13. Install the upper bearing spring.



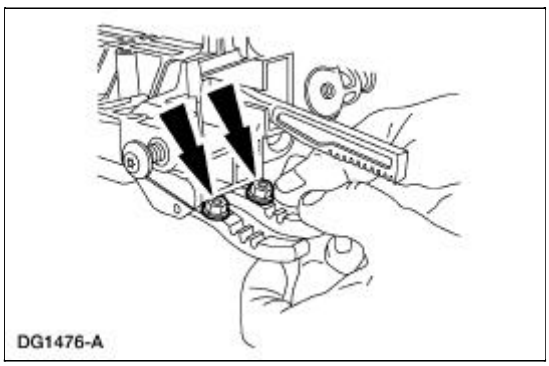
14. Install the snap ring.



15. Install the tilt pivot screws loosely and position the actuator housing in a vise.
    - Lubricate the pivot screws with Ignition Lock Grease F0AZ-19584-A or equivalent meeting Ford specification ESA-M1C232-A.



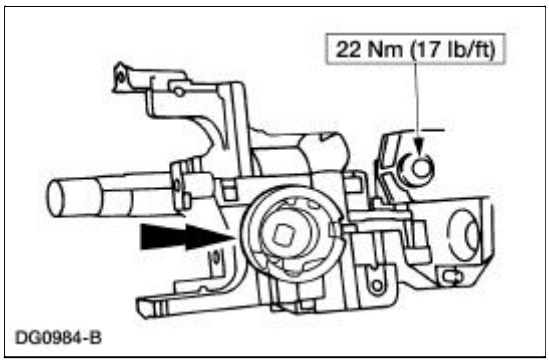
16. Place two nuts or spacers to hold the lock levers away from the actuator housing.



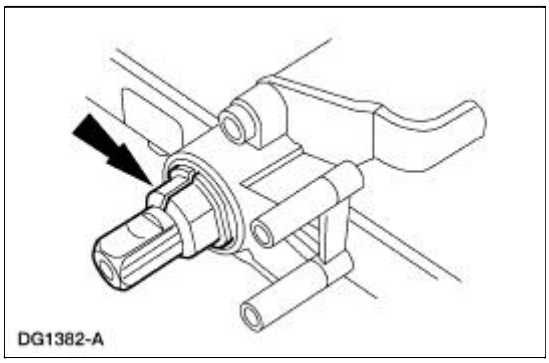
17. **NOTE:** Lubricate the lock cylinder housing pivot bushings with Ignition Lock Grease F0AZ-19584-A or equivalent meeting Ford specification ESA-M1C232-A.

Install the lock cylinder housing.

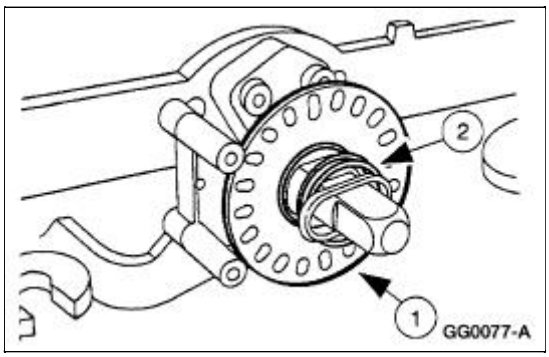
- Position the lock cylinder housing and the shaft assembly on the actuator housing.
- Make sure the upper and lower lock actuators are aligned.
- Install and compress the steering column position spring.
- Align the lock cylinder housing bushings with the pivot screws and tighten the screws.
- Using a long thin screwdriver, remove the nuts installed under the lock levers.



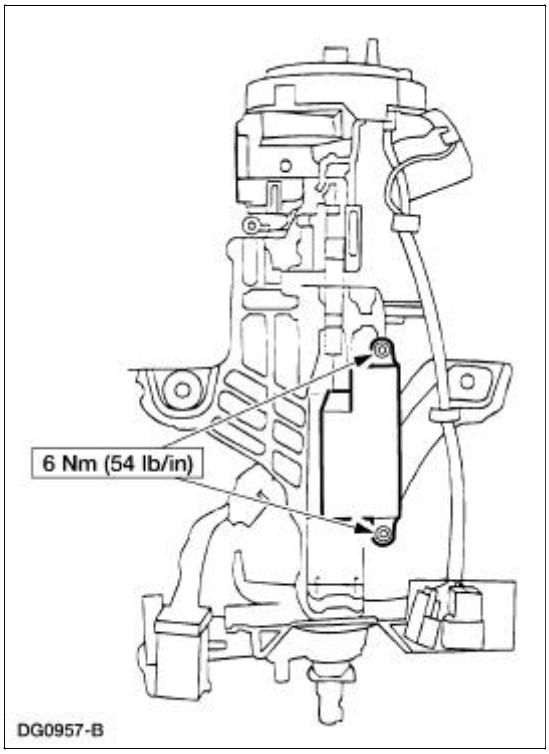
18. Install the bearing tolerance ring.



19. Install the sensor ring.
    1. Install the sensor ring.
    2. Install the lower bearing spring.



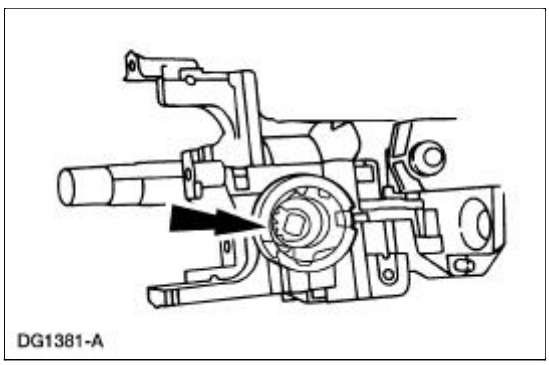
20. Install the ignition switch. Align the ignition switch with the slot and index-mark on the actuator housing.
    - Install the screws.



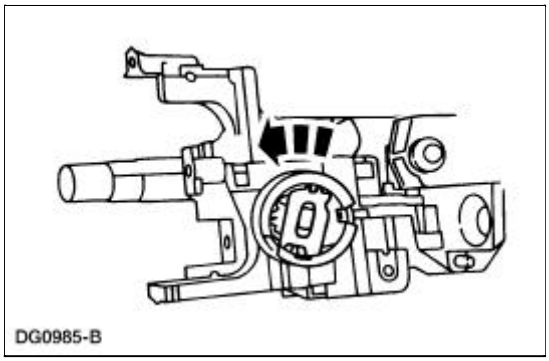
21. **NOTE:** The narrow section of the keyhole in the lock gear should be in the one o'clock position.

    Install the lock gear.

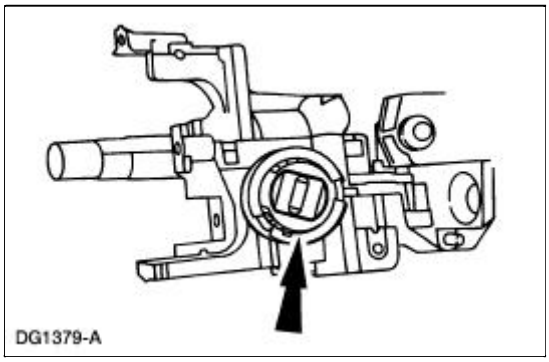
    - Use Ignition Lock Grease F0AZ-19584-A or equivalent meeting Ford specification ESA-M1C232-A to coat the lock gear.



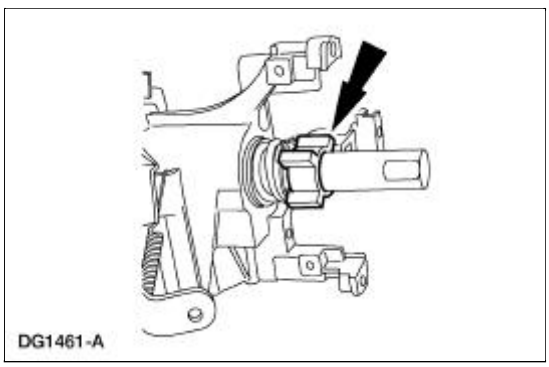
22. Install the lock housing bearing.
    - The narrow section of the keyhole should be in the one o'clock position, with the tab inboard at the three o'clock position, and rotate it counterclockwise.
    - Lubricate the lock housing bearing with Ignition Lock Grease F0AZ-19584-A or equivalent meeting Ford specification ESA-M1C232-A.



23. Install the upper bearing retainer firmly to engage the four retention tabs into the lock housing.



24. Install the turn indicator cancel cam.



25. **WARNING: To avoid risk of serious personal injury, follow all warnings, cautions, notes and instructions in the steering column removal and installation procedure.**

Install the steering column. For additional information, refer to Column in this section.

Torque Specifications

Description	Nm	lb-ft	lb-in
Ignition switch screws	6	—	53
Instrument panel reinforcement screws	9	—	80
Instrument panel steering column cover screws	9	—	80
Key release button bolt	5	—	44

Steering Column Switches

The steering column switches system consists of the following components:

- multifunction switch (13K359)
- key release button (manual transmission only) (3F527)
- ignition switch (11572)

The integrated multifunction switch is mounted to the LH side of the steering column and controls the turn signals, hazard flasher, windshield wiper/washer control, and headlamp dimmer/flash-to-pass.

The key release button is equipped with manual transmissions only.

The ignition switch is mounted below the steering column and is activated by rotating the key lock cylinder on the steering column.

Steering Column Switches

Refer to Wiring Diagrams Cell 13 , Power Distribution for schematic and connector information.

Refer to Wiring Diagrams Cell 81 , Interval Wiper/Washer for schematic and connector information.

Refer to Wiring Diagrams Cell 85 , Headlamps for schematic and connector information.

Refer to Wiring Diagrams Cell 90 , Turn/Stop/Hazard Lamps for schematic and connector information.

Special Tool(s)

ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool
ST1137-A	73 Digital Multimeter 105-R0051 or equivalent

Inspection and Verification

1. Verify the customer concern by operating the multifunction or ignition switch.
2. Visually inspect for obvious signs of mechanical and electrical damage.

Visual Inspection Chart

Mechanical	Electrical
● Ignition key ● Ignition switch ● Multifunction switch ● Turn signal switch ● Hazard/flasher switch	● Battery junction box (BJB) Fuses: ■ (3) IGN (40A) ● Central junction box (CJB) Fuses: ■ 6 (25A) ■ 39 (5A) ● Damaged wiring harness ● Loose or corroded connections

3. If the concern remains after the inspection, connect the scan tool to the data link connector (DLC) located beneath the instrument panel and select the vehicle to be tested from the scan tool menu. If the scan tool does not communicate with the vehicle:
   - check that the program card is correctly installed.

- check the connections to the vehicle.
- check the ignition switch position.

4. If the scan tool still does not communicate with the vehicle, refer to the scan tool manual.

5. Carry out the DATA LINK DIAGNOSTIC TEST. If the scan tool responds with:
   - CKT914, CKT915 or CKT70 =ALL ECUS NO RESP/NOT EQUIP, refer to Section 418-00 .
   - NO RESP/NOT EQUIP for GEM, go to Pinpoint Test A.
   - SYSTEM PASSED, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs and carry out self-test diagnostics for the GEM.

6. If the DTCs retrieved are related to the concern, go to the GEM Diagnostic Trouble Code (DTC) Index to continue diagnostics.

7. If no DTCs related to the concern are retrieved, proceed to the Symptom Chart to continue diagnostics.

GEM Diagnostic Trouble Code (DTC) Index

GEM Diagnostic Trouble Code (DTC) Index

DTC	Description	Source	Action
B1217	Horn Relay Coil Circuit Failure	GEM	REFER to Section 413-06 .
B1218	Horn Relay Coil Circuit Short to Vbatt	GEM	REFER to Section 413-06 .
B1312	Lamp Headlamp Input Circuit Short to Battery	GEM	REFER to Section 417-01 .
B1317	Battery Voltage High	GEM	REFER to Section 414-00 .
B1318	Battery Voltage Low	GEM	REFER to Section 414-00 .
B1322	Driver Door Ajar Circuit Short to Ground	GEM	REFER to Section 417-02 .
B1330	Passenger Door Ajar Circuit Short to Ground	GEM	REFER to Section 417-02 .
B1334	Decklid Ajar Rear Door Circuit Short to Ground	GEM	REFER to Section 417-02 .
B1339	Chime Input Request Circuit Short to Battery	GEM	REFER to Section 413-09 .
B1340	Chime Input Request Circuit Short to Ground	GEM	REFER to Section 413-09 .
B1342	ECU Is Defective	GEM	CLEAR the DTC. Retrieve the DTCs. If DTC B1342 is retrieved, INSTALL a new GEM. REFER to Section 419-10 .
B1353	Ignition Key-In Circuit Open	GEM	REFER to Section 413-09 .
B1359	Ignition Run/Acc Circuit Failure	GEM	GO to Pinpoint Test E .
B1396	Power Door Lock Circuit Short to Battery	GEM	REFER to Section 501-14B .
B1397	Power Door Unlock Circuit Short to Battery	GEM	REFER to Section 501-14B .

B1405	Driver Power Window Down Circuit Short to Battery	GEM	REFER to Section 501-11 .
B1408	Driver Power Window Up Circuit Short to Battery	GEM	REFER to Section 501-11 .
B1410	Driver Power Window Motor Circuit Failure	GEM	REFER to Section 501-11 .
B1426	Lamp Safety Belt Circuit Short to Battery	GEM	REFER to Section 413-01 .
B1428	Lamp Safety Belt Circuit Failure	GEM	REFER to Section 413-01 .
B1431	Wiper Brake/Run Relay Circuit Failure	GEM	REFER to Section 501-16 .
B1432	Wiper Brake/Run Relay Circuit Short to Battery	GEM	REFER to Section 501-16 .
B1434	Wiper Hi/Low Speed Relay Coil Circuit Failure	GEM	REFER to Section 501-16 .
B1436	Wiper Hi/Low Speed Relay Coil Circuit Short to Battery	GEM	REFER to Section 501-16 .
B1438	Wiper Mode Select Switch Circuit Failure	GEM	REFER to Section 501-16 .
B1441	Wiper Mode Select Switch Circuit Short to Ground	GEM	REFER to Section 501-16 .
B1446	Wiper Park Sense Circuit Failure	GEM	REFER to Section 501-16 .
B1448	Wiper Park Sense Circuit Short to Battery	GEM	REFER to Section 501-16 .
B1450	Wiper Wash/Delay Switch Circuit Failure	GEM	REFER to Section 501-16 .
B1453	Wiper Wash/Delay Switch Circuit Short to Ground	GEM	REFER to Section 501-16 .
B1458	Wiper Washer Pump Motor Relay Circuit Failure	GEM	REFER to Section 501-16 .
B1460	Wiper Washer Pump Motor Relay Coil Circuit Short to Battery	GEM	REFER to Section 501-16 .
B1462	Safety Belt Switch Circuit Failure	GEM	REFER to Section 413-09 .
B1466	Wiper Hi/Low Speed Not Switching	GEM	REFER to Section 501-16 .
B1473	Wiper Low Speed Circuit Motor Failure	GEM	REFER to Section 501-16 .
B1476	Wiper High Speed Circuit Motor Failure	GEM	REFER to Section 501-16 .
B1551	Decklid Release Circuit Failure	GEM	REFER to Section 501-14B .
B1553	Decklid Release Circuit Short to Battery	GEM	REFER to Section 501-14B .
B1555	Ignition Run/Start Circuit Failure	GEM	GO to Pinpoint Test D .
B1687	Lamp Dome Input Circuit Short to Battery	GEM	REFER to Section 417-02 .
B2486	LF Side Repeater Lamp Output	GEM	REFER to Section 417-01 .

	Circuit Failure		
B2488	RF Side Repeater Lamp Output Circuit Failure	GEM	REFER to Section 417-01 .
C1189	Brake Fluid Level Sensor Input Short Circuit to Ground	GEM	REFER to Section 413-01 .
C1223	Lamp Brake Warning Output Circuit Failure	GEM	REFER to Section 413-01 .
C1225	Lamp Brake Warning Output Circuit Short to Battery	GEM	REFER to Section 413-01 .

Symptom Chart

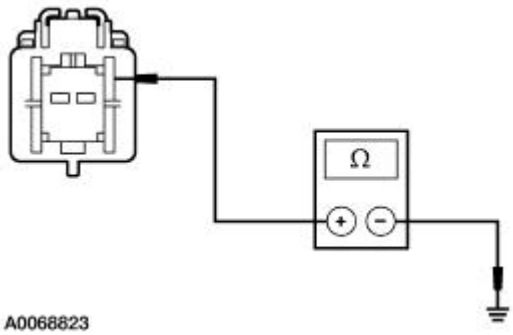
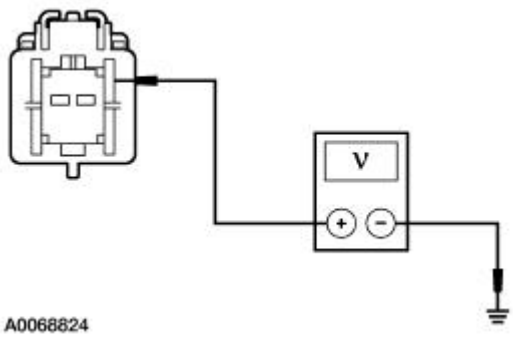
Symptom Chart

Condition	Possible Sources	Action
● No communication with the generic electronic module	● CJB Fuse 39 (5A). ● Circuitry. ● GEM.	● Go To Pinpoint Test A .
● The ignition switch is inoperative	● BJB Fuse IGN SW (40A). ● Ignition switch. ● Circuitry.	● Go To Pinpoint Test B .
● No power in ACC	● Ignition switch. ● Circuitry.	● Go To Pinpoint Test C .
● No power in RUN	● Ignition switch. ● Circuitry.	● Go To Pinpoint Test D .
● No power in START	● Ignition switch. ● Circuitry.	● Go To Pinpoint Test E .
● The multifunction switch/hazard switch does not operate correctly	● Multifunction switch.	● Carry out the multifunction switch component test. REFER to Wiring Diagrams, Cell 149, Component Testing.

Pinpoint Tests

PINPOINT TEST A: NO COMMUNICATION WITH THE GENERIC ELECTRONIC MODULE

Test Step	Result / Action to Take
CAUTION: Use the correct probe adapter(s) when making measurements. Filaure to use the correct probe adapter(s) may damage the connector.	
A1 CHECK THE GENERIC ELECTRONIC MODULE (GEM) POWER SUPPLY	
● Key in OFF position. ● Disconnect: Generic Electronic Module (GEM) C201a.	**Yes** GO to A2 .

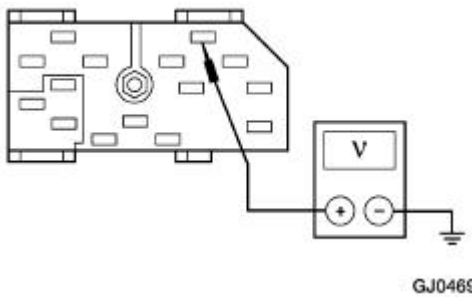
• Disconnect: GEM C201b. • Key in ON position. • Using the following table. measure the voltage between the GEM, harness side and ground. **Connector / Pin / Circuit** C201a / 2 / 400 (LB/BK) C201a / 3 / 1006 (DG/WH) C201b / 1 / 1001 (WH/YE) C201b / 4 / 193 (YE/LG) • **Are the voltages greater than 10 volts?**	**No** REPAIR the circuit(s) in question. TEST the system for normal operation.
A2 CHECK THE GEM GROUND CIRCUIT 397 (BK/WH) FOR OPEN	
• Key in OFF position. • Measure the resistance between the GEM C201b pin 2, circuit 397 (BK/WH), harness side and ground.  A0068823 • **Is the resistance less than 5 ohms?**	**Yes** GO to A3 . **No** REPAIR the circuit(s) in question. TEST the system for normal operation.
A3 CHECK CIRCUIT 397 (BK/WH) FOR SHORT TO POWER	
• Measure the voltage between GEM C201b pin 2, circuit 397 (BK/WH), harness side and ground.  A0068824 • **Is any voltage present?**	**Yes** REPAIR the circuit. TEST the system for normal operation. **No** REFER to Section 418-00 .

PINPOINT TEST B: THE IGNITION SWITCH IS INOPERATIVE

Test Step	Result / Action to Take
B1 CHECK THE IGNITION SWITCH	**Yes** INSTALL a new BJB. TEST the system for normal operation.
• Carry out the ignition switch component test. REFER to Wiring Diagrams Cell 149, Component Testing. • **Is the ignition switch OK ?**	

	No INSTALL a new ignition switch. REFER to Ignition Switch . TEST the system for normal operation.

PINPOINT TEST C: NO POWER IN ACC

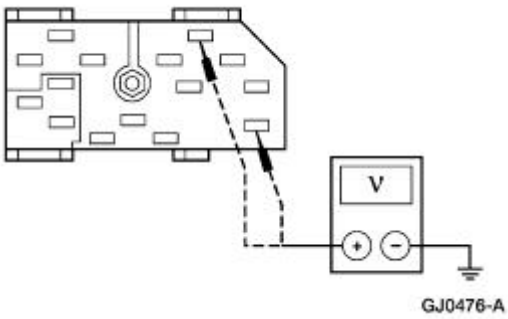
Test Step	Result / Action to Take
C1 CHECK THE RADIO FOR NORMAL OPERATION	**Yes** GO to C2 . **No** Go To Pinpoint Test D .
● Key in ON position. ● Check the radio for normal operation. ● **Does the radio operate correctly?**	
C2 CHECK THE VOLTAGE AT THE IGNITION SWITCH	**Yes** INSTALL a new ignition switch. REFER to Ignition Switch . TEST the system for normal operation. **No** REPAIR the circuit. TEST the system for normal operation.
● Disconnect: Ignition Switch C250 . ● Measure the voltage between ignition switch C250 Pin B5, Circuit 1050 (LG/VT), harness side and ground.  GJ0469-A ● **Is the voltage greater than 10 volts?**	

PINPOINT TEST D: NO POWER IN RUN

Test Step	Result / Action to Take
D1 CHECK THE IGNITION SWITCH	**Yes** INSTALL a new BJB. TEST the system for normal operation. **No** INSTALL a new ignition switch. REFER to Ignition Switch . TEST the system for normal operation.
● Carry out the ignition switch component test. REFER to Wiring Diagrams Cell 149, Component Testing. ● **Is the ignition switch OK ?**	

PINPOINT TEST E: NO POWER IN START

Test Step	Result / Action to Take
E1 CHECK THE VOLTAGE TO THE IGNITION SWITCH	**Yes** GO to E2 .
● Key in OFF position. ● Disconnect: Ignition Switch C250 .	

• Measure the voltage between ignition switch C250 Pin B4, Circuit 1050 (LG/VT), harness side and ground; and between ignition switch C250 Pin B5, Circuit 1050 (LG/VT), harness side and ground.  • **Are the voltages greater than 10 volts?**	**No** REPAIR the circuit in question.TEST system for normal operation.
E2 CHECK THE CONTINUITY OF THE IGNITION SWITCH	
• Carry out the ignition switch continuity test. REFER to Wiring Diagrams, Cell 149, Component Testing. • **Does the ignition switch test OK?**	**Yes** GO to E3 . **No** INSTALL a new ignition switch. REFER to Ignition Switch . TEST the system for normal operation.
E3 CHECK CIRCUIT 16 (RD/LB), AND CIRCUIT 33 (WH/PK)	
• Connect: Ignition Switch C250. • Turn ignition switch to START. • **Does the starter engage?**	**Yes** REPAIR Circuit 16 (RD/LB). TEST the system for normal operation. **No** REPAIR Circuit 33 (WH/PK). TEST the system for normal operation.

Component Test

Ignition Switch Continuity Check

Refer to Wiring Diagrams Cell 149, Component Testing.

Multifunction Switch

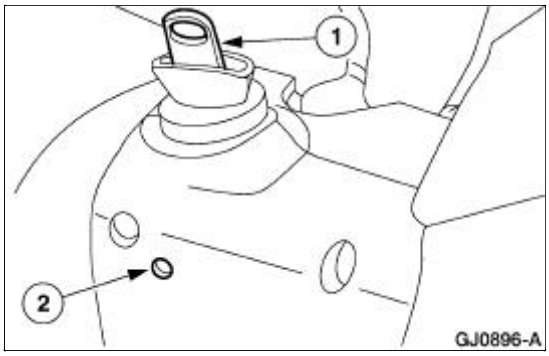
Refer to Wiring Diagrams Cell 149, Component Testing.

Multifunction Switch

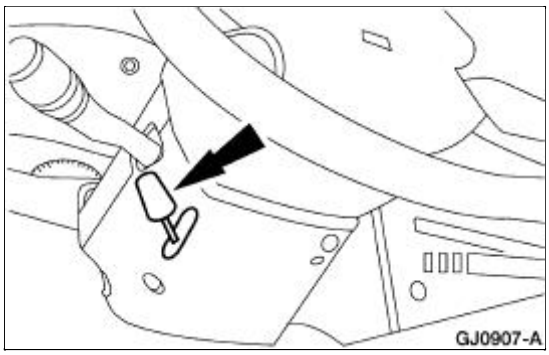
Removal

1. Disconnect the battery ground cable.

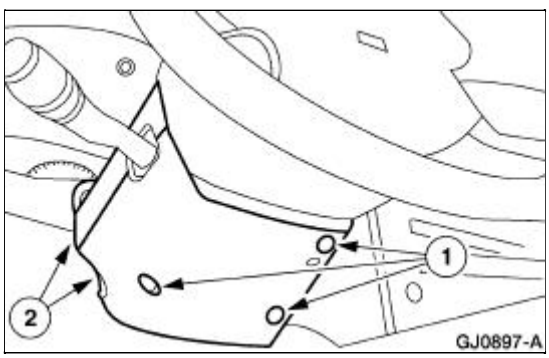
2. Remove the ignition switch lock cylinder.
    1. Insert the ignition key into the ignition switch lock cylinder and turn to RUN position.
    2. Push the ignition switch lock cylinder release tab with a punch while pulling out the ignition switch lock cylinder.



3. Remove the tilt wheel handle.

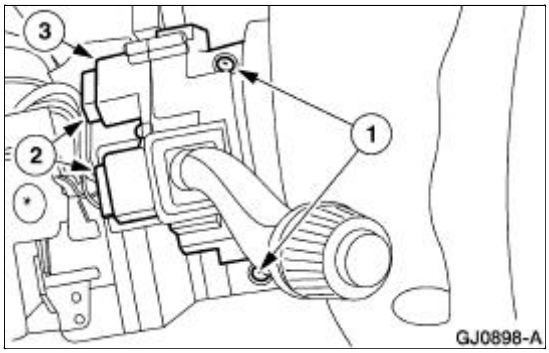


4. Remove the upper and lower steering column shrouds.
    1. Remove the screws.
    2. Remove the upper and lower steering column shrouds.



5. Remove the multifunction switch.
    1. Remove the screws.

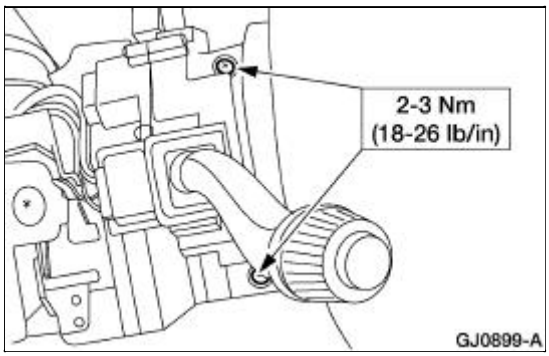
2. Disconnect the electrical connectors.
3. Remove the multifunction switch.



Installation

1. **NOTE:** When the battery is disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 mi) or more to relearn the strategy.

   To install, reverse the removal procedure.

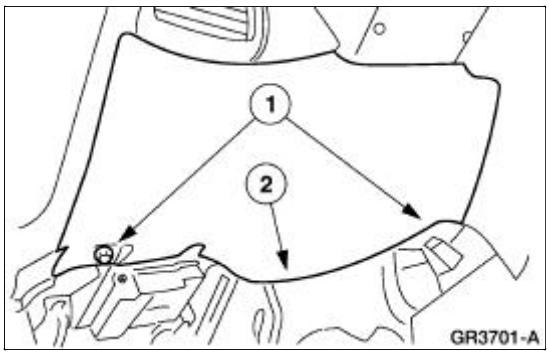


Ignition Switch

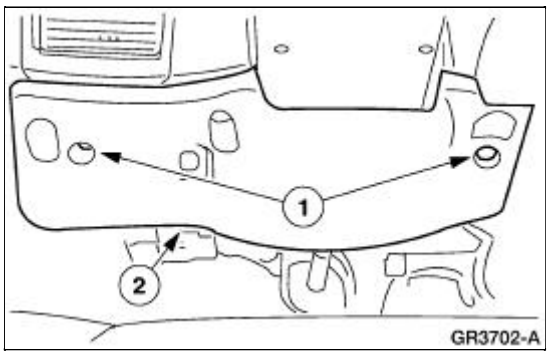
Removal

1. Disconnect the battery ground cable.

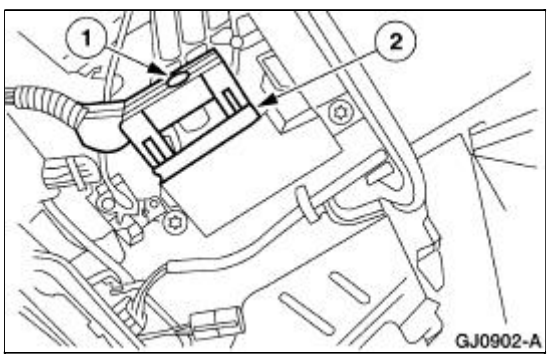
2. Remove the lower instrument panel steering column cover.
    1. Remove the screws.
    2. Remove the lower instrument panel steering column cover.



3. Remove the instrument panel reinforcement.
    1. Remove the screws.
    2. Remove the instrument panel reinforcement.



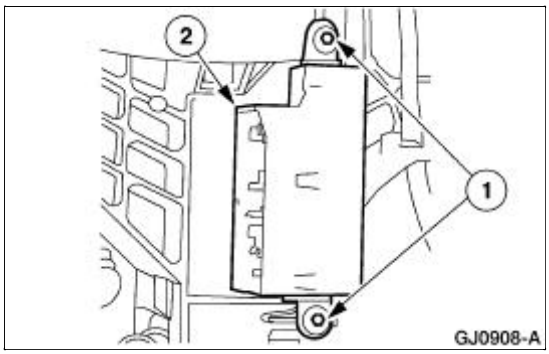
4. Disconnect the ignition switch electrical connector.
    1. Loosen the bolt.
    2. Disconnect the ignition switch electrical connector.



5. **NOTE:** Ignition switch should be in the OFF position.

Remove the ignition switch.

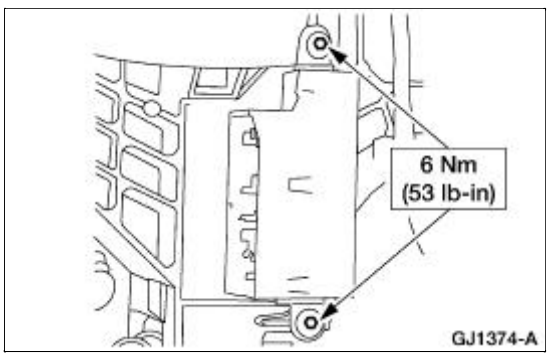
1. Remove the screws.
2. Remove the ignition switch.

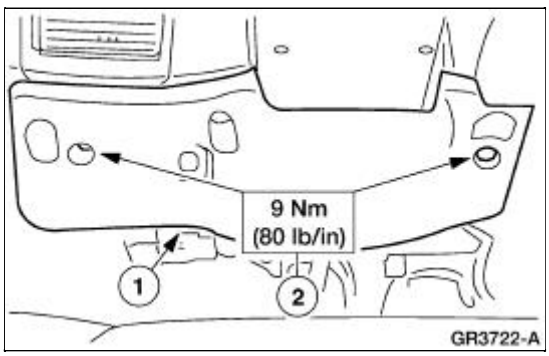


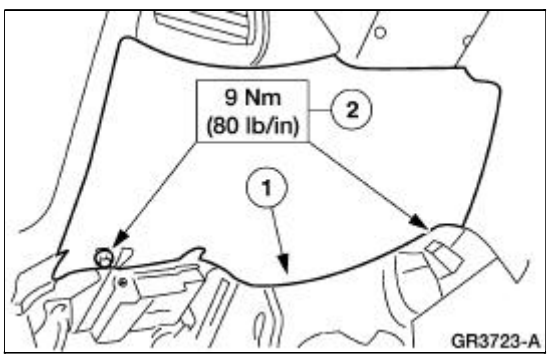
Installation

1. **NOTE:** When the battery is disconnected and reconnected, some abnormal drive symptoms may occur while the vehicle relearns its adaptive strategy. The vehicle may need to be driven 16 km (10 mi) or more to relearn the strategy.

   To install, reverse the removal procedure.





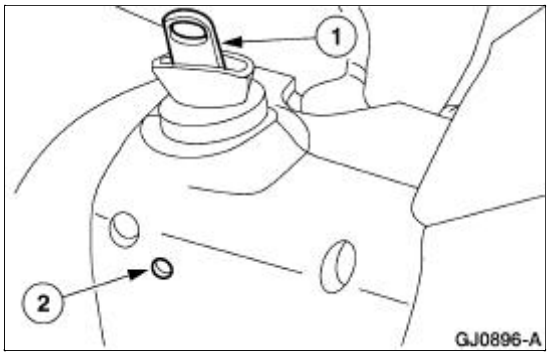


Key Release Button

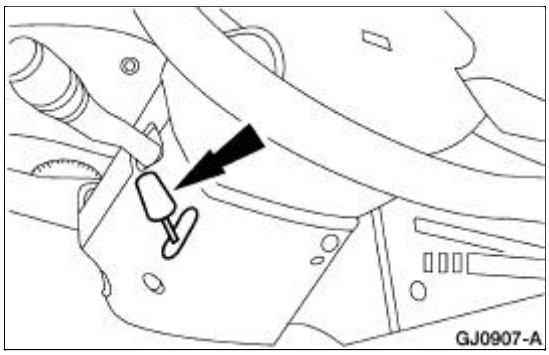
Removal

1. Disconnect the battery ground cable.

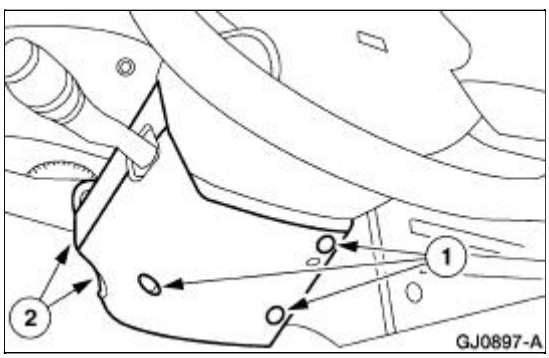
2. Remove the ignition switch lock cylinder.
    1. Insert the ignition key into the ignition switch lock cylinder and turn to RUN position.
    2. Push the ignition switch lock cylinder release tab with a punch while pulling out the ignition switch lock cylinder.



3. Remove the tilt wheel handle.

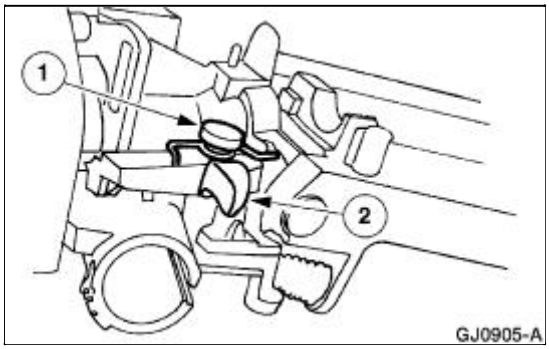


4. Remove the upper and lower steering column shrouds.
    1. Remove the screws.
    2. Remove the upper and lower steering column shrouds.



5. Remove the key release button.
    1. Remove the key release button bolt.

2. Remove the release button handle and the spring.



Installation

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   To install, reverse the removal procedure.